AMERICAN HEALTH PRIMERS

WINTER AND ITS DANGERS

OSGOOD

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AMERICAN HEALTH PRIMERS.

Edited by W. W. KEEN, M.D.,

Fellow of the College of Physicians of Philadelphia; Surgeon to St. Mary's Hospital, etc.

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Fellow of the College of Physicians of Philadelphia,
and Surgeon to St. Mary's Hospital.

Hygeia.

AMERICAN HEALTH PRIMERS.

With the Kind Esteem of the Author.

WINTER

AND ITS DANGERS.

BY

HAMILTON OSGOOD, M.D.,

Editorial Staff of the Boston Medical and Surgical Journal.

PHILADELPHIA:
LINDSAY & BLAKISTON.
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WINTER AND ITS DANGERS.

CHAPTER I.

GENERAL CONSIDERATIONS.

THE French have a quaint but startling proverb, "On ne meurt que de bêtise." A free translation would be — The common cause of death is stupidity. Too often we hear it said that the afflictions caused by sickness or loss of dear friends are due to "the will of an inscrutable Providence," when carelessness in dress, bad drainage, foolish exposure, poorly-ventilated houses, and much other recklessness and negligence, lie at the root of the whole matter. When shall we learn to be wise in the care of our bodies? Do we lack warning? Does anybody realize that scores and scores of good and earnest books have been written on hygiene? What is the touchstone which will arouse the people to a realization of the necessity of even simple knowledge of how to live wisely in a physical sense?

Bodily laws cannot be broken with impunity. If

disregarded, many of them demand a penalty which too often involves precious lives. This is especially the case when we are exposed to "winter and its dangers," and the conscientious physician finds no task more difficult than that of impressing upon his patients the necessity of what should be merely ordinary care of their bodies during the winter season. Unfortunately, many consider the caution asked of them as extraordinary, extreme, and unnecessary; and either neglect the feet, the lungs, the throat, and are careless as to proper clothing, proper defence against sudden change of temperature, sensible arrangement for heating and ventilating their houses or apartments, or, they attend to these matters with a half-heartedness and indifference which are next to utter heedlessness.

Negligence of this nature is a sin when it is confined strictly to the adult body, and if the penalty follow, one is tempted to say: "The punishment is just." But what is to be thought of those whose indolent carelessness brings sickness upon the tender children who are confided to their care? These delicate beings cannot think for themselves. They cannot judge as to what they need in dress, in temperature, in protection against cold. All days are alike to them. Half-clad limbs and uncovered throats do not arouse their indignation against their foolish parents. Innocent and helpless, they must passively

accept what is given them. And yet the terrible list of infant mortality, with its solemn warnings, brings but slow change. Neglect continues and children die like flowers in a bitter frost.

It would seem as if there should be a law forbidding marriage until it is shown that possible fathers and mothers have received at least superficial education in the care of children. The amount of general ignorance, even among the more intelligent, in regard to the simplest physiology and natural philosophy, is amazing. People cannot conceive how a slight chill, life in close hot rooms, constant absence of sunlight, severe exercise during fasting, warm or cold full baths before breakfast, and other wrong-doing of like nature, can work such harm. The fact is, the general public has little or no education in these matters. So far as a wise care of the body is concerned, people live and rear their children with a dangerous indifference to hygienic laws, and the dangers increase according as the weather is colder. In summer we live nearer to a state of nature; our windows are open, baths are frequent, we are out of doors by the hour, our food is fresh and succulent, the sunshine purifies our blood. But winter comes, and with him the furnace and the double windows. Fresh, pure air has become converted into an enemy; we sit long hours in rooms lighted by gas and heated by hot air; the atmosphere remains unchanged; we re-breathe our own

breath and that of everybody else in the room. We go out and come in without sufficient thought as to protecting ourselves against the very abrupt change in temperature. We forget the dangers of draughts. We neglect the warning cough and ache and pain, and in a thousand ways are in the grasp of the dangers of winter.

To explain what they are, how they arise, and how they may be met, overcome, and, particularly, how they may be avoided, is the pleasant task which lies before me.

CHAPTER II.

DANGERS ARISING FROM ERRORS IN DRESS.

WHEN a man freezes to death, it is because the blood at the surface of the body, that is, in the skin, has become cool at a rate more rapid than the production of heat in the interior of the body. The effect is an increasing depression of vitality. At first there is pain in the parts exposed, then the skin loses feeling, the muscles lose their energy, the breathing becomes less and less vigorous, the mind grows sluggish, drowsiness overwhelms the unfortunate, and he dies.

Now what has happened here? In a strict sense, the man did not grow colder and colder, but became less and less warm, that is, he lost more and more of his bodily heat, until too little remained to support life. He lost it faster than he could make it. For it is one of the characteristics of all animals that, all things being equal, by internal chemical processes the temperature of their bodies remains at a degree which varies but little. What these processes are, is not the province of this book to explain; but, while they are not perfectly understood, even by the ablest

physiologists, the general opinion is that the heat which the body so constantly and steadily manufactures, is developed by the normal destruction and renewal of the elements of the latter. And a striking peculiarity of this bodily temperature is that, under all conditions, it *remains the same.* No matter whether we are as near the North pole as anybody ever has been, or whether we are at the equator, we are no colder in the one place than we are warmer in the other.

It must be understood, however, that the external portions of the body are normally cooler than the internal by about one and one half to two degrees. The blood from within conveys warmth to the skin, and there loses a certain portion of its heat, but upon its return to the internal organs, again becomes warmer, a fresh supply of heat being brought to the outer districts of the body by a new supply of blood. This oscillation goes on constantly, and, unless some influence act with cooling effect upon the surface of the body, this relation between internal and external temperature remains nearly the same.

Roughly speaking, the process resembles that by which a house is heated by hot water in pipes. The pipes near the outer walls are necessarily somewhat cooler than those at the centre of the house. They lose more heat. But when it returns to the source of heat, the water which passes through them regains what it has lost.

The skin is supplied with countless blood-vessels,

small in size, their calibre being controlled by nerves, called *vaso-motor*, or vessel-moving nerves, whose office it is to keep the vessels at a given size. This they do by stimulating muscular fibres which exist in the walls of the arterioles, as the smaller arteries are called. Stimulation causes these muscular fibres to contract, and thus hold the vessels in a grasp which prevents their dilatation beyond a certain limit. Now, when a person is exposed to a low temperature, the cold acts upon the nerves in such a manner that they *over-stimulate* the muscular fibres, which then contract the small vessels of the skin in an abnormal degree. The blood is then not only driven out of the vessels, but their spasm prevents the ingress of new blood, consequently the larger arteries within the body are subjected to a high pressure by the blood, which in this way is dammed up within them.

But while the internal heat is economized, the heart and blood-vessels are exposed to serious dangers, which are due to the high pressure. If the heart be weak, the sudden call upon it for more vigorous action may paralyze it. This danger especially applies to the aged, in whom, besides, the blood-vessels are liable to be weak and brittle. When, therefore, cold weather comes on abruptly, sudden deaths among the fragile and the aged are common; the cause being apoplexy or arrest of the heart, perhaps congestion of the lungs.

Another evil effect of sudden cold, or even chill, is a checking of the perspiration. The result may be pneumonia, pleurisy, bronchitis, rheumatism, or kidney trouble, with their train of dangerous, too often mortal, after-affects. Ordinary colds and throat affections are so common after exposure to low temperature, that hardly any one escapes them.

It having been shown how the body loses its warmth, we see the purpose to which our clothing is mainly devoted, viz., to prevent a loss of heat; in other words, to *keep* the body warm. For clothing does not create heat, it simply preserves it. The proper value of clothing, then, depends upon such wise use of it as will maintain the normal equilibrium between the inner and outer temperature of the body. This necessitates the most careful attention to what we wear and how we wear it.

There is a popular theory that *hardening* will inure one to any degree of cold—to the most sudden changes of temperature. Nothing could be more fruitful of danger. Of course, now and then, there is an individual who can adopt the hardening process without apparent ill effect. But the theory is pernicious. This is shown by the condition of both men and animals in countries where there is prolonged exposure to cold. The Esquimaux and Laplanders are small in stature, and the people of Terra del Fuego, who go without clothing in coldest weather,

are so dwarfed and stunted as to be merely hideous suggestions of human beings. Shetland ponies, and the sheep and cattle of bleak climates, are small in size, simply because cold prevents their development.

There are no words strong enough to characterize the folly of those parents who think it right to "harden" their children by forcing them to face the cold insufficiently clad. "By this means," sharply says one writer, "children are hardened out of the world." Something might be said with greater sharpness of the thoughtlessness of unwise parents.

If it were possible to compute the number of children who lose their lives simply because they are not warmly enough dressed, the statistics would startle fathers and mothers. The death-rate of children in cold climates during winter, especially in Russia, is enormous. In justice to fathers, however, it must be said that they are less responsible for the ill-judged manner in which many children are dressed in winter, than are the mothers.

Dr. Edwards, a writer on hygiene, has shown by experiment that in warm-blooded animals (*children included*) the power of producing heat is at its minimum at birth, and that it progressively increases to adult age. In old age it again stands at a low degree. The aged should therefore be protected as carefully as the young. But, amazing as it may seem,

it is commonly believed, among the laity, that children manufacture heat more rapidly than do adults. The fact is, they make it less readily and lose it more quickly, and the strain to which the system is exposed in its struggle to maintain the proper equilibrium is most exhausting to the child. He cannot afford to lose his warmth, nor can he afford to make an undue amount of it. The same remarks apply to the aged, many of whom are "never warm" in winter. Take an example in which there is vigor, viz., the Scotch Highlanders. In spite of being habituated to exposure of the knees, they suffer very much from rheumatism.

It should be understood, too, that the digestive and assimilative processes of the body cannot properly go on if the heat-producing forces be over-worked. In the words of Liebig, "Clothing, in reference to temperature, is merely an equivalent for a certain amount of food." That is to say, the warmer the body the less fuel it will need. Cattle-raisers know that the constant exposure of their animals to cold costs the latter fat and muscle; and that the greater the intensity of the cold, so much the more food must they have in order to avoid an arrest of growth. Moreover, clothing saves labor for the system, for it retains and economizes heat which otherwise would be lost, and would have to be replaced at the expense of actual strength.

In one sense, perhaps, clothing is objectionable. It cannot be denied, that if the skin could bear changes of temperature without danger to the system at large, the contact of fresh air would make it more healthful and increase its power of resistance. As it is,—a sufficiency of food being taken for granted,—power of resistance must be sought in abundant use of fresh air, exercise, and proper bathing.

It is probably true that men are more sensible than women in their manner of protecting themselves against cold. For instance, I do not remember ever to have heard of a man who wore a coat with short sleeves or low neck, or who *laid aside a merino under-vest on a night of bitter cold* in order to be able to wear a dress without neck or sleeves. But it is a matter for devout thankfulness that nowadays the demon Fashion permits women and children to cover their bodies warmly and wear thick-soled boots.

But errors still exist in the dress of women; errors which undoubtedly have much influence in bringing upon them affections peculiar to the winter season.

Facile princeps is the corset. No other article of dress has ever done so much harm. This is a trite subject; one, too, which almost invariably arouses opposition in the wearer. But in spite of the fact that it is less worn than formerly, and that women have gradually loosened the lacings, the corset still does harm, and requires mention.

What physician ever yet met a female patient who was willing to admit that her corset was too tight? Anything and everything must be sacrificed to what is considered beauty of form. Do women dress for their own sex or for ours? If for their own, then one argument falls to the ground. If for ours, then it must be confessed that it is amazing that women have not yet discovered that no sensible man finds beauty in a wasp waist. He knows it is unnatural. He knows it is abnormal. Moreover, he is familiar with its evil effects, and feels a respect for the woman who refuses to make use of this article of dress.

The corset does especial harm in two ways: it prevents free entrance of air into the lungs; (on this subject a recent writer wittily says, "Women remind me irresistibly of the Keeley Motor — expecting a great deal of motion with very little air; the experiment seems to succeed, but the machine fails;") again, the corset prevents free flow of blood to certain organs, and from within outward, and disturbs the circulation in the skin. It likewise compresses the abdomen, and consequently interferes with digestion and the healthful performance of the functions of important organs. These effects may be observed at any season of the year, but it is in winter that such violent compression of the body is particularly dangerous. For, any agency which prevents free action of the lungs and abundant entrance of pure air ren-

ders these organs more liable to suffer during sudden changes of temperature. Especially so because this evil pressure so embarrasses the flow of the blood that the lungs are suffused by an unnaturally large amount of the vital fluid. This condition is the one of all others which makes the breathing organs sensitive to every change of temperature. The mucous membrane — the lining of the throat and bronchial tubes — is surcharged with blood; the agencies which manufacture the mucus are over-active. The whole is in readiness to pass into a state of inflammation, and only a slight chill is needed to set up a bronchitis, a pneumonia, or a pleurisy. Moreover, the less oxygen we inhale, the less heat can the body manufacture. The organs below the waist are likewise in a disturbed and unbalanced state, and the cold may fix upon one of these. Or the trouble may take a more indirect route and enter the body by the feet, which, in tightly-laced women, are almost invariably cold. There exists a great sympathy between them and the lungs. Consequently, while a chill seems to act only upon the feet, the lungs or throat subsequently become involved. If not these, the chill will attack the weak point in the system, whatever that may be. Women may escape these effects, but the heart is constantly overworked and abused, for it finds serious difficulty in sending its blood throughout the body. If its condition is im-

perfect, then the over-strain may secondarily cause congestion of the lungs or brain. Constant fatigue eventually produces weakness or enlargement of this faithful servant which works so unceasingly for our welfare.

Another writer incisively remarks: "The more a woman's waist is shaped like an hour-glass, the more it shows us that her sands of life are running out." Women wonder why they feel ill at ease, why the heart palpitates, why breathing is difficult, why they suffer from "rush of blood to the head." If their corsets are tight, let them seek the reason in their effects. I should not neglect to mention that the corset is especially injurious to half-grown girls. In addition to other evils it arrests free development of the chest, and prevents freedom of muscular action.

Any portion of the clothing which tightly binds the skin increases the dangers to which winter exposes us. For this reason women err in wearing the garter below the knee. It most certainly causes coldness of the feet, and throws back upon the body a portion of the blood which should make an unfettered round through the limbs.

It were better not to wear garters in any manner, but if their use be insisted upon, it is far safer and more healthful to wear them above than below the knee. The most sensible plan is that afforded by the dress reform, viz., to support the stockings by straps

worn over the shoulders. By this means all compression is avoided.

When their skirts are carried by the hips, women place another obstacle in the way of free circulation of the blood, and, unless there be free circulation, the body can never enjoy equable warmth. Danger is then always at hand. The effect of the weight of the skirts upon the abdominal organs does not belong to my subject, but should suggest itself to every sensible woman. The only way of escape from all these evils is the use of the modern improvements in the underdress of women.

In winter, especially, the clothing should be worn so loosely as to allow a small space between it and the body. We all know that a loose garment is warmer than a tight one. The reason simply is that between the loose dress and the body is a layer of warm air, which preserves the warmth of the part it covers. A good example is the difference in warmth between a loose and a tight glove. Or, suppose a stove to be enclosed in a jacket of sheet-iron ; if it were placed but one-eighth of an inch from the stove, the latter of course would lose its heat much less quickly than if the jacket were in close contact with it.

In regard to the *material* of which winter clothing should be composed, but little need be said concerning outer garments. The real need, and my experience has shown me that the need is serious, is

more general intelligence in the use of under-clothing. The material which comes next the body in winter should be *flannel.* Comparatively few wear silk under-garments. If sufficiently heavy they make a good substitute for flannel. In using the term flannel, I naturally include the heavy wool woven-goods, the so-called "merino" fabric. In whatever form it be used, *wool* should be worn next the skin. It is light, durable, and porous. It is the best known defence against cold and chill. If it become damp by perspiration, it is still a protection, "for," says Parkes, "the moisture becomes condensed in its fibre, and gives out again the large amount of heat which became latent when the water was vaporized. Therefore, from that fact alone, woollen feels warm during perspiration." I well remember how often, during a long sea-voyage, I wrung the water out of my knit-jacket on rainy days, at once putting it on again and finding it warm. This is a sailor's trick, and most useful when dry garments are not at hand. Woollen is warmer simply because it preserves heat. It is a poor conductor, and notwithstanding the fact that a person might keep himself warm in cotton or linen, a sudden exposure to a cool air would quickly prove the superiority of wool; for both linen and cotton allow a rapid radiation of heat. If such material be worn next the skin, it becomes easily moistened during perspiration, and, as a conductor, acts so much

more effectually than woollen, that upon exposure to draught, or upon arrest of exercise, the body at once becomes sensible of a sharp and dangerous chilliness.

Young ladies who indulge in ballroom costumes, cannot uncover the neck and arms unless they lay aside the undervest. At the ball they become heated by dancing, and, lacking the usual protection, are in imminent danger of contracting lung affections. Indeed, they even throw up the window, and, finding the air agreeable, remain in it too long. I could give details of sad cases in which bright and charming girls lost their lives in precisely this manner. Unfortunately, however, it is almost impossible to impress upon women the necessity for great care in making a change of dress in winter, especially for evening wear. They are notoriously careless. Some of them, indeed, absolutely refuse to wear woollen undergarments. Others will wear them, but of such thin texture, that they are next to nothing. Now, if women are not warmly clad, they cannot live in comfort; but they do live in constant danger. They suffer from headaches, neuralgias of various degree, dyspepsia, lack of buoyancy; they lose color and appetite. These symptoms are unaccountable to them. But if they would only economize their bodily warmth, these annoyances would often disappear.

Recently a patient of mine was losing her strength most mysteriously. I found she did not wear thick, warm drawers, but merely a garment of cotton or linen. Insisting upon the use of warmer clothing, I had the pleasure of seeing her strength revive.

In another case the lady suffered from terrible headaches, and from neuralgia in various portions of the body. She did wear underclothing of merino, but of such thin material, that it was easy to account for her neuralgia. I ordered full suits of the heaviest "Cartwright & Warner" underwear. The overtasked system was relieved, and the pains and aches disappeared.

A third lady for years has been the victim of severe attacks of bronchitis during the months from November to May. The slightest change in the weather gave her a sore throat. In her case I recommended a light suit of merino next the skin, over this a second of heavy, scarlet, all-wool merino, both suits being made in one piece, so that there were only two instead of four thicknesses at the waist. Wearing this protection, the lady has not had a cough once during the past winter. She was formerly one of the bitterest enemies to woollen underwear. It irritated the skin. It kept her in a constant fever. It ruined the fit of her dresses, etc. I had the greatest difficulty in overcoming her prejudice to what she finally looked upon as her chief protection.

This hatred of woollen undergarments, on the part of women, is as common as it is inexplicable. It causes the loss of many treasured lives. "It is not enough," said Hippocrates, "that the physician advises; he must be seconded by his patient." "Many colds and their sequels," says another, "are due to too great security on the part of the patient, and indifference of the physician." The physician must watch and advise, the patient should heed and obey.

When I speak of "whole suits," I refer to those which have long sleeves, high necks, and which reach the ankle. The irritating effect of wool upon the skin soon becomes unnoticed, and in itself is a means of keeping the surface of the body in a glow of warmth. The wool-fibre is warmer than any other material, because of its bad conducting power, and because it is less easily penetrated by cold water. A person even while perspiring may go into the open air with considerable security, if only clad in flannel.

Cotton and linen are permissible in winter only when worn over woollen. Next the body, they actually invite chilliness by the rapidity with which they allow the heat of the body to escape. Let me again impress the fact that loss of bodily warmth is an actual loss of sustenance. The English term, "starved with cold," is as true as it seems peculiar. If we expend power in a wasteful manufacture of heat, we

lose in muscular strength, in bodily weight, in mental balance and capacity.

The assertion of some individuals who do not wear it, that flannel is therefore needless, is a poor argument; the question being, Will not the greater number be beneficially protected thereby? The uncertain nature of our climate should make the matter clear.

Winter clothing, too, should be equably warm; that is, it should protect all parts equally. The habit of piling clothing upon the upper portions of the body, while the limbs and feet are neglected, is both injurious and dangerous. Such a mode of dress deprives the limbs of necessary blood, and consequently warmth, while the upper portions are supplied by too much blood, and become over-sensitive. Besides, if a person is attempting to protect the lungs, he will succeed better by wearing heavy drawers, stockings, and boots, than by neglecting the feet, and overloading the chest. When the lungs are sensitive, sufficient protection may be found in an extra layer of flannel in front and behind. One piece will answer; a hole being cut for the head, and a half-moon being taken out where the flannel lies upon the shoulders. I think the chest-protectors sold by apothecaries too heavy. Other and excellent means of defending the chest I will mention in the chapter on Errors in Bathing.

Much and serious harm is caused by the unwise

practice of wearing summer clothing late into the autumn, and of assuming light outer garments and underwear so soon in spring as a warm day appears. The health in many cases is undermined by neglecting dress of proper warmth in early autumn. It is an error to suppose if thick clothing be worn in early November that it must be much warmer in January. What will keep us comfortably warm in the damp chilliness of November, will answer perfectly well in the dry, clear cold of winter. During early spring and late fall months, the very moist air is a good conductor of heat, and in such weather the body loses warmth very rapidly, and becomes chilled if not sufficiently clad. I cannot too strongly impress the fact that many lung diseases are contracted during these uncertain seasons by improper dress. The winter underclothing should be put on *early* and worn *late*. If a day be very warm, the change must be made in the *outside* garments. A lady should carry an extra shawl, a gentleman should by no means leave his overcoat at home. If the temperature suddenly fall, both then have clothing wherewith to meet the change. Europeans dress more warmly than we, and have less catarrh, especially the Dutch, one of whose great physicians once said: "Flannel should not be put off until midsummer's day, and should be put on — the day after."

The fact is, as a people, we are impatient with a

momentary discomfort in dress, and prefer the exposure of hours of chill to thirty minutes of a little too much warmth. Only physicians realize how vast is the harm which is brought about by our carelessness in meeting the changes of temperature in our fickle climate. Moreover, the mucous membrane of the breathing apparatus — the nose, throat, and bronchial tubes — quickly forms the *habit* of taking on a catarrhal condition upon slight causes. One cold leaves effects which dispose the parts affected to repeat the condition. One catarrh leads to another until, perhaps, a chronic catarrh has become established. If fixed at first in the nose and upper portion of the throat, it frequently spreads over the mucous membrane, just as moisture which has wet one side of a porous cloth may spread across the whole piece. In this case we should speak of "capillary attraction;" in the mucous membrane the process of extension seems similar, but is really an advance from cell to cell, cells being the elements of which the mucous membrane is chiefly composed. A catarrh of long standing changes the condition of the cells to such a degree that even the mucus which is poured out by the membrane becomes vicious in its nature and almost poisonous in its effects. The wet cloth can be dried by the fire, but the affected mucous membrane often resists every form of treatment, and, as we all know, when the catarrh has gone down the

windpipe and reached the lungs, it is a most insidious enemy.

Does it not, therefore, seem almost superfluous to say that our positive duty is to defend ourselves against the danger of taking cold by sensible use of warm clothing? Of course, a chill does not always involve the lungs, or indeed any portion of the system, if we but possess the vigor to throw off and get rid of its effects; but still this can be done only at the expense of the whole system.

A cold will sometimes avoid the throat and lungs, and seize upon some other organ, viz., upon the weak point in the organization. If an engine have a weak spot, a careful engineer will not ask of his machine more execution than can be borne by the lame portion. If he did, he would be untrustworthy. In the care of our bodies, if we know we have a sensitive organ, we should not consider any part stronger than the weakest. If we do, the strain will come upon the weak part, and convert it into a door by which disease may enter the system. A person may say, "My lungs are perfectly strong. I never have colds. I am not going to bury myself under clothing!" But this person has a weak heart, weak kidneys, or weak bowels, is liable to rheumatism or neuralgia. If then he ask his system to bear too much cold, he is surprised by an attack in the weak locality or organ, and is at a loss as to its cause, for in other respects his life

may have been wise and careful. In such cases, the cost is paid by the sensitive organ. Every individual, therefore, should study his needs as to clothing. No precise system of winter dress can be established. Within certain limits, each of us may be a law unto himself, *but must see to it that the law is wise.* It should invariably include the wearing of wool next the skin. But as to the remainder of the dress, requisite modification may be made in the outer or, as the English call them, the "upper garments."

The practice of swathing the throat and lower portion of the face in cold weather is an error. Once begin this practice, and it must be continued, thus depriving the lungs and blood of much of the oxygen which is their food and life. There is no danger in exposing the face and throat, if the dress be equably warm as high as it is usually worn. Button the outer garment high up across the chest, and, unless it be found necessary to protect the ears, the parts above may be left to themselves. But there is an exception to this advice. After speaking or singing for a length of time on a winter's night, it is not safe to encounter and inhale a cold air, without first warming it. This may be done, not by wrapping a heavy scarf, or by buttoning a fur collar about the throat and mouth, but by folding a large handkerchief, tying the long ends together behind the neck, so that the broad portion may hang loosely in front of the chin. By resting the

latter upon the chest, the breath is directed against the handkerchief, and warms the air to be inhaled at the next inspiration. This arrangement accomplishes the desired result, namely, the prevention of the entrance of very cold air into a throat flushed and heated by vocal exercise. The mouth should be kept absolutely shut. Breathing must be performed by the nose, in which there are several warm curved plates which likewise assist in raising the temperature of the air as it passes through the nostrils. Talking in the open air, after using the voice for a whole evening in a hot room, should be stringently forbidden. The exposure of a heated throat to freezing air is the cause of much serious harm. I have known dangerous attacks of throat and bronchial affections to follow such an event. It may be added, that in all cases of inflammation of the throat and nose, the use of the handkerchief, as described, may be adopted during the day and evening as well. It need not be said that there is no better protection than the beard; but this appendage is so ruled by fashion, that mere allusion to it is sufficient.

Another common error in winter is the habit of removing outer garments immediately upon entering the house, and of going into the cold air at once, after assuming them. Though many are not aware of it, this practice is a most fertile cause of colds or something worse. Doubtless it may have been noticed upon entering the house, even though it be very

warm, that the body is conscious of a feeling of chilliness. If the outer garments be at once removed, the chill is still more noticeable. The rule should be to wait a little, until the outer clothing has become permeated by the warmth of the house. Then it may be laid aside. This is a rule upon which I insist, especially in the case of children. The over-dress usually hangs where the temperature is lower than that of the room in which we sit. For this reason, it should be warmed before we put it on, or, we should remain in the warm room after assuming the garment until its chilliness has gone. A careful observance of this hint will repay one for a little extra trouble.

Another foolish and dangerous custom in our country, is that of wearing overcoats, or other outside garments, in churches and places of amusement. Its effects are vicious. A person thus clad in a public room, which, in the majority of instances, is overheated, has procured for himself all the elements of a hot-air bath. His under-clothing becomes damp. The small vessels of the skin become dilated. In a state of perspiration, after one, two, or three hours of this parboiling, he goes out to encounter a biting air. The perspiration is checked, as if turned off by a stop-cock; the chilled blood goes to the inner organs in a torrent. How many constitutions are able to bear repetitions of such a strain? Is such carelessness anything less than suicidal? It arises from

nothing but indolence. Adults deserve the consequences, but children are innocent victims, unless their parents remove their clothing for them.

A bad form of indolent carelessness leads many persons to continue wearing damp clothing, damp boots and stockings, after entering the house. After what has been said touching the rapidity with which heat leaves the body, it is only necessary to add that if the clothing be damp, the radiation of heat continues with immensely increased quickness and volume. Unless the cause be removed, the result may be deadly. Damp garments should be laid aside *at once* upon reaching home. In addition to the change of clothing, delicate persons and children should be thoroughly rubbed until in a glow, and meanwhile drink something hot, as milk or beef-tea. For, a warm drink which is nourishing will do its work a score of times more faithfully and certainly than the so-called stimulants, whose great value lies in their evanescent power of spurring the heart.

In these days of *horse-cars*, a word of warning will not be amiss. In these vehicles we are constantly exposed to draughts. The conductor leaves the rear door open, and pushes back the front door to collect fares. The quick rush of cold air strikes every person in the car. Delicate children are especial victims of these conditions. In winter it is always wise to take an extra garment with which to protect the chest

and legs while in the cars. When tempted, on a cold day, to open a window, because of the impure air of the car, it is well to remember that a few moments spent in a disagreeable atmosphere are less dangerous than a draught of cold air. Besides, the air in a quickly moving car is in unceasing motion, and is renewed from moment to moment. In Boston, posted in the horse-cars, is the request that passengers will complain of conductors who hold open the front door while collecting platform fares. This is a first step towards the removal of this dangerous nuisance. The truth is, cars should be so constructed that none but the driver can occupy the front platform. But we know what corporations are. In many ways the public health is at the mercy of their whims, and appeal to them is usually vain.

No sensible person would wear *thin boots* in winter, and yet the physician often has reason to chide patients for their rashness in this regard. And notwithstanding the fact that boots of the proper thickness may now be worn by ladies without disobeying the dictates of fashion, I had occasion, during the past winter, to insist in several instances that thin boots worn by young ladies should be replaced by heavier material. The patients actually struggled in their vain arguments in favor of going almost barefooted. It need not be said that thick soles and stout uppers should be the invariable rule. As to the stockings, wool

ought to be the fabric worn, but since some individuals are annoyed by sweating of the feet, a combination of cotton and wool will answer. Overshoes of rubber are bad, especially if worn for a length of time. They entirely check all evaporation, and leave the feet damp. "Arctics" are now made of such light material that even ladies may wear them. They should take the place of rubber shoes, but even they should be put off as soon as possible. While driving, ladies will find great comfort in heavy wool hose, or in the convenient woollen arctics, worn over the boots.

In spite of all protection, however, many persons suffer night and day from cold feet. The most simple and sensible means of overcoming this trouble is to dip the feet into cold water, submerging them merely for a few seconds; after which they should be vigorously rubbed with a coarse towel (mittens of crash or hair are better), until they are in a glow. Follow this by a brisk chafing with the bare hands. Pursue the practice twice daily, and in a short time the feet will remain warm for hours. It is a mistake to go to sleep with cold feet. Indeed, they keep many people awake. An additional help will be found in shaking a small quantity of red pepper into the stockings in the morning. If these methods do not succeed, then probably the heart needs more tone. To make this clear, suppose a garden to receive its supply of water only from a central pump which sends the fluid to all

the beds through pipes which grow smaller as they approach the circumference of the garden. If the pump lose power, the outlying beds will be the first to suffer. In that case the pump needs the machinist. If the feet, far removed from the human pump, remain obstinately cold, the probability is that this pump needs more vigor, for warm feet depend upon an active circulation, the warmth being kept constant by renewal and movement of the blood. Perhaps, too, the blood needs iron. At any rate, an intelligent physician will know what to give to both heart and blood.

Rubber over-garments are so far from healthful that in the French army their use has been forbidden. They should be worn only in case of absolute need, and only for a short time, for they create a very free perspiration, and at the same time prevent its evaporation, thus exposing the wearer, in winter weather, to danger of becoming severely chilled.

It seems hardly necessary to say more in regard to the dress of children in winter; but so many children are the objects of kind-hearted but thoughtless neglect, that my protest against the too common carelessness of parents must again be expressed. Children are never still; they run from hot rooms into cold halls; they dash out of doors on the least pretence. In winter they are always in danger. Protect them, then. Give them whole suits of under-

clothing, even to the very young, no matter how much trouble it may involve. The bare thighs of children are a sin of the mother. Give them thick stockings and over-leggings when they go out of doors, long double coats, and earlaps. They lose heat with immense rapidity. Take care of them; watch them constantly and vary their dress a score of times daily, if need be, according to their condition and the temperature in which they are. If they come in with cold hands and feet, a brisk rubbing is the need. Indeed, every child should be rubbed in the morning and at bedtime, and the night-clothing should be made dry and warm. Mention of what they should wear at night will be found under the topic of *night-clothing*. Remember that when a room is warm enough for adults, the children may be cold. It may not be wise to make the room warmer, but the children may have an extra garment. On the contrary, if the temperature of the room be too warm for the child, remove some garment, unless the thermometer record a degree higher than 68°; in that case, cool the room.

Children contract lung and throat affections with such ease, that in winter their clothing and the temperature of their bodies require constant vigilance. On the other hand, it would be equally unwise to weaken and make a child sensitive by too much clothing. It is precisely here that good judgment

is necessary. If the child be cold, the eye of a careful mother will soon detect the signs, and by watchfulness learn what the need of the little one is, in order to be kept warm without too much call upon the heat-producing forces.

It remains to speak of *night-clothing*. On very cold nights, in our haste to become warm, the temptation is to use too many blankets. This is as mischievous as too few; for, lulled to sleep by the comfort of warmth, we are not aware that the inordinate amount of clothing prevents proper evaporation of insensible perspiration and radiation of heat. Consequently, we awake in the morning in a perspiration, and find ourselves not only unrefreshed, but we often leave the bed absolutely chilly. We are thus weakened and rendered liable to take cold. Experiment will teach us how *little* clothing we need at night. During sleep the body loses about one degree of temperature, so that it must be properly but not over protected. Delicate individuals, and those who easily take cold, may wisely wear under the night-dress an undervest of moderate thickness; those who are restless and liable to uncover the arms and chest, whether male or female, may wear an outside jacket of flannel, of color and fashion to suit individual taste. This garment is often necessary, especially if the chamber, as it should be, is cool.

In the case of very young children, there is always

danger from their uncomfortable habit of throwing off the bed-clothing. Anxious mothers will gladly learn that, in spite of this annoyance, their children may still remain covered. In regulating the night-clothing of children, I always insist upon a night undervest,—which may be a little thinner than the day garment,—a long flannel or cotton-flannel night-dress, buttoned over into a bag beyond the feet, or a whole suit — the so-called "night-drawers"— buttoned at the ankle, and, instead of the undervest, an outer jacket of some pretty French flannel stuff. The blankets should be correspondingly lighter. The most sensible manner of protecting children under three years of age is by the use of a large, loose bag of heavy flannel. A light blanket may be used. Put the child into the bag, the mouth of which should be just large enough to admit the body, and fasten the whole to the night-dress, under the armpits, by means of stout "safety-pins." This is a most excellent plan, which will save the mother anxiety and trouble, and likewise relieve the few fathers who are unselfish enough to attend to the children during the night. The bag should not be so heavy as to do away with blankets, and of course, when young children are thus dressed at night, care should be taken to see that the ordinary bed-clothing is not too heavy.

The bed-dress of every person should be loose at waist and neck. Much of the refreshing influence

of sleep is due to the freedom of the body from all constriction. Pressure upon any portion of the body is more distressing when we are in the recumbent position. It not only causes cold feet and oppression of the head and heart, but bad dreams as well. The sleeping-room should never be warm, but the temperature ought always to be a regulator of the quantity of clothing worn.

The bed-clothing of the aged in winter requires especial care. The old find extreme difficulty in keeping warm, and are very sensitive to cold. A sudden rush of blood from the surface to the internal organs in chill, is doubtless a frequent cause of nervous irritability, perhaps paralysis and apoplexy; and, as already remarked, the heart, which in the aged is almost always weak, should be spared all sudden strain. Old people often die suddenly during cold nights, and therefore need much clothing, especially if the blood-vessels and kidneys be weak.

It may be remarked that bed-clothing should never be so heavy as to be oppressive by its weight. Such may be chosen as will be light as well as warm, as eider-down quilts, light, thick comforters, woolly blankets, etc.

There is much temptation to linger on this subject, for, of all the dangers in winter, those which arise from errors in dress are the most frequent. A sufficiency of clothing in cold weather undoubtedly lengthens life. Colds in spring and fall are due to sudden

changes rather than to severity of weather, but the changes are harmless if met by the proper amount of clothing. Whereas, a heavy cold contracted before cold weather fairly appears, is apt to disturb a person, seriously perhaps, during the entire winter. In a low tone of the system, these abrupt changes in the weather are the more dangerous and hurtful, because there is a lessened power of resistance. Let it be remembered, besides, that a rough climate is bearable if food be plentiful and the body be kept warm. Sad, indeed, is the condition of those who lack both clothing and nourishment. Fashion, if it interfere with health, should be disregarded. A writer on hygiene severely says: "The self-immolation of women, and the sacrifice of their children to the god of fashion, is most devoutly practised. What sort of protest can reach their consciences?"

Finally, I would earnestly impress upon mothers the knowledge that the dress of young girls, especially at a certain age, should be as loose as that of boys. I personally know mothers who are so unwise as to put corsets on girls as young as five years of age! Compression simply arrests development of the chest, ruins the form, makes the lungs feeble, and keeps the whole body chilly. One would think that here were reasons enough for leaving the bodies of growing girls as God made them. But some silly mothers attempt to fashion them after their own mistaken ideals.

CHAPTER III.

CARELESSNESS AND IGNORANCE IN BATHING.

PURSUING the mingled plan of showing the dangers of winter while suggesting the means of avoiding them, the result of ignorance and carelessness in bathing during the cold season next demands our attention.

In regard to the manner, time, and temperature of the bath, the opinions of the laity are as varied as the means of bathing. Much of their theory is false, and has no good physiological basis. Many think a bath simply a means of cleanliness, being ignorant of its immense power for good or evil, and of the lasting nature of its effects. Few, perhaps, realize that a bath taken one day may be the cause of illness, depression, lassitude, or chilliness on the next. Whatever dangers accrue from errors in connection with bathing, they naturally are more frequent as well as more prominent in winter. It would seem almost superfluous to allude to dangers which arise from taking no bath at all, for one can hardly imagine such a condition of things. But physicians

meet with very odd, very indolent, and very careless people, who use water much as the colored gentleman used his blacking-brush — deeming it sufficient if only the toe of his boot were polished.

The primary benefit of the bath is the removal of the sebaceous or oily matters which accumulate on the skin, and mixing with the perspiration easily catch and retain dust and other foreign matters.

The solid portions of the perspiration likewise remain, pack the pores full, and, if not removed by frequent washing, actually form a sort of varnish which prevents healthful and necessary evaporation of moisture, and throws upon the lungs and kidneys work which should be performed by the skin. These organs may be unequal to the increased demand upon them, and therefore fall sick either in their structure or functions. The dry scales, which are always in a state of looseness upon the skin, being pushed off by new skin elements which are unceasingly coming to the surface, when retained, only add to the general uncleanliness. It need not be said that this condition of things, if prolonged, soon affects the health of the individual. It is a dangerous thing, then, to shut up and cast back upon the system matters which are effete and unwholesome. Although the perspiratory ducts on the surface of the skin may be closed by this adhesive varnish, another set of vessels, called the absorbents, are by no means closed. They will do their

work, and waste and morbid material, which should be washed off the body, is otherwise carried by these "scavengers" — as they have happily been termed — back into the blood. How long it will be before the system at large feels the effect of such an interference with its general economy, may be left to any person of good sense.

If the suppression of this exhalation from the skin be sudden, internal inflammations, and congestion or general poisoning of the blood, may occur. This is why a chill is so dangerous. A gradual interference with the normal activity of the skin by lack of cleanliness, produces headache, lassitude, and feverishness.

Nervous energy depends much upon the stimulus of the nervous centres by a bright, pure, fresh blood. If the vital fluid become impure and stagnant from a burden of waste matter which should, but cannot, escape from the skin, or which has been carried there and discharged, to find the outer door shut, and then has become absorbed by the scavengers of the body, is it surprising that the individual feels depressed and inactive, that he has a poor appetite and aching head? If a person be engaged in an occupation which soils the skin, he naturally would use means to remove the foreign matter. But it must not be forgotten that another person, surrounded by every elegance and luxury, in fastidiously cleanly apartment, (which he would not suffer to be otherwise,) if he live a sedentary existence

in a warm room, is accumulating upon his skin a more dangerous form of foreign matter — dead material of poisonous nature. The laborer perspires freely; his flannel shirt constantly chafes and irritates the skin, and thus removes much of the external layer. The person of sedentary habit, or of less active life, however, retains upon the surface of his skin the matter brought to it for removal. Hebra, a famous German authority upon the skin, is recently reported as saying that people bathe too much! May we not refer him to the birds?

Another use of the skin is respiration. It may be new to many that we breathe through the skin; yet experiment, particularly that by Aubert, has shown that the skin gives off carbonic acid and absorbs oxygen. Aubert enclosed a person in an air-tight case, leaving only the head exposed. By proper means, the quantity of carbonic acid exhaled by the surface of this man's body was measured, and found to represent about 0.5 *per cent. of the amount given off by the lungs in the same time.* Infants breathe somewhat imperfectly for some time after birth, but they are aided by respiration through their soft, pink skin. How dangerous, then, would be uncleanliness in such cases! It is amazing to witness the indifference of some individuals to bathing. It is a natural necessity. Birds and animals seek for means of cleanliness. The boating-man, pedestrian, prize-fighter, know how vital is

the necessity of perfect purity of the skin. The lesson is taught on all hands. A horse which was never, or but imperfectly, groomed, would make but a sorry figure in a contest with another horse of nearly equal ability, but whose coat was glossy and skin well kept.

In summer, we bathe because the bath is a luxurious and delightful means of securing comfort. But the bath is as absolutely necessary in winter, for during that season the temperature and lessened exercise diminish the perspiration and evaporation from the skin, and a more rapid accumulation of dead matter takes place upon it. The bath, moreover, is a powerful means of protection, as will be shown elsewhere.

Another evil effect of neglect of the skin is that its own functions become disturbed. Its circulation becomes imperfect; one of the various and annoying skin troubles may make its appearance, and the individual flies to the medicine-bottle, ignorant of the fact that in many cases a skin disease is due to disturbance of the functions of the external covering, and does not, by any means, indicate poor or impure blood, as is the general but erroneous belief. In many cases, where they have been neglected, bathing and friction will restore all the functions of the skin.

Prolonged affection of the skin, however, may affect the general health, for internal and external conditions of the body react upon each other. This reac-

tionary influence is most featly shown by Sir Alfred Power in the following quaint lines:

"There 's a skin without and a skin within,
A covering skin and a lining skin;
But the skin within is the skin without
Doubled inwards and carried completely throughout.

The palate, the nostrils, the windpipe and throat,
Are all of them lined with this inner coat;
Which through every part is made to extend,
Lungs, liver, and bowels, from end to end.

The outside skin is a marvellous plan
For exuding the dregs of the flesh of man,
While the inner extracts from the food and the air
What is needed the waste in his flesh to repair.

While it goes well with the outside skin,
You may feel pretty sure all 's right within;
For if anything puts the inner skin out
Of order, it troubles the skin without."

So surely as an unhealthy condition of the skin creates abnormal sensations in the system at large, just so surely will the skin, if kept pliable, cleanly, and active, react with an invigorating effect upon the whole constitution. This may be brought about by wise and timely bathing.

Many persons think the proper time for a full bath is the hour before breakfast. This is not only an error, but one fraught with danger. We have seen

that there are individuals who can bear the winter's cold lightly clad. So there are persons who can take a full bath before breakfast, a cold bath at that, and yet retain their vigor throughout the day. But rest assured these are exceptions. In order to enjoy the full benefit of a bath, we must be able to react; that is, to reëstablish an equilibrium in the circulation. This is accomplished by a vigorous heart. The heart is stimulated to action by nerves called accelerator nerves, which receive their power from the central batteries,— nerve-centres in the brain. These nerve-centres are sustained and invigorated by the contact of pure, strong blood. The source of their vigor varies in its inspirating properties. The river of blood, like the sea, has its rise and fall of tides. But while the sea has two flood- and two ebb-tides in the twenty-four hours, the river of the blood has but one ebb and one flow. It is at low tide in the morning. This, probably, is why the sick so often die in early morning hours. A wise nurse, during the night, will prevent the ebb by constant administration of strong food, and thus save or prolong life.

Between the time of our evening meal and breakfast, many hours elapse. During the day we give the blood a fresh supply of food every five or six hours. Then come ten, twelve, or fourteen hours, during which the majority do not eat at all. Meanwhile, the tide of the river of life ~~goes~~ goes out, and we are in

no condition to meet the exhausting effects of a bath.

It is very well to rhapsodize over the delights of a long walk or ride before breakfast, but they cost too much. In winter, probably, but few go out before the morning meal; but many persons take a full bath on rising. This is borrowing at a high rate of interest, which, in the majority of cases, must be paid before night, and in any case sooner or later. Whether the bath be hot or cold, the skin becomes chilled, either by direct contact of cold water, or of air much cooler than the temperature of the bath. The effect of this, as already explained, is a contraction of the blood-vessels of the skin. The blood being driven towards the centre of the body, calls for increased activity of the heart and nervous centres. The latter have not yet received their morning meal of freshly nourished blood, and consequently are working upon yesterday's sustenance. They become fatigued and depressed before the day's work is begun, and, as a matter of course, lassitude creeps over the system long before night. More serious than this, is the decreased power of resistance to cold, especially if the morning bath be warm. If it be cold, the effect is indirectly the same. In one case the pores are left in a state of expansion, the blood-vessels are dilated, the skin is in a sensitive condition, and quickly becomes chilled. In the

other (a cold bath having been taken) the nerve-centres are too tired to keep up the normal force of the heart, and the skin and extremities become chilly. Chilliness itself causes an expenditure of nerve power, for the system ever strives to preserve a general equilibrium of its forces.

A morning bath, moreover, is very apt to deprive one of appetite for breakfast; for Nature, if abused, will surely revenge herself. She is a patient servant, never relaxing her endeavors to sustain us, keep us strong, and defend us from illness. But there are conditions over which she has no control. If we violate these, she permits the consequences to fall.

A morning bath and no breakfast, surely are a bad preparation for encountering a cold day. And yet there are people who are so daft on the subject of bathing, that, in spite of warnings which Nature never fails to give, they continue the morning bath, and actually feel morally superior to the unfortunates who choose a more fitting hour for bathing.

Diminished power of resistance, lassitude, and lack of physical tone are not the only effect of a winter morning bath, especially if it be cold. The internal organs, overladen with the blood with which they have suddenly been flushed by the contracted blood-vessels of the skin, are often obliged for hours to submit to this abnormal fulness; for the heart may not have sufficient vigor to drive the blood back to

the surface. So far as the onward movement of the blood is concerned, all organs except the heart are perfectly passive. If the central pump do not force it onward with normal power, the blood remains too long in one place, stagnating, becoming impure, and, worse than this, interfering with and disturbing the functions of the organs, so that the brain may feel heavy and confused; breathing, perhaps, becomes oppressed; diarrhœa or the opposite may set in; the stomach is nauseated, etc. More than this, lung troubles are easily contracted, and the liver does not act because of over-fulness.

A case in point is that of a gentleman who suffered from congestion of the liver, constipation, and headache, and his skin had a yellow tinge. A professional man in active practice, these symptoms were very annoying to him. A careful analysis of his daily life revealed the fact that, for several years, he had taken a daily shower-bath (an invention of the devil) before breakfast, using cold water. He was so fond of his shower-bath, that no argument of mine availed against it. He continued it, and besides this also took a walk before breakfasting. Eventually, however, he was vanquished by an illness which put him in great danger. It was all that was needed to overcome his frenzy for the morning bath. Within six weeks after abandoning the practice his skin became clear, his liver righted itself, his appetite and general

health improved, and my fees decreased in proportion.

Now here was a case in which an evil practice had been followed with apparent impunity for years, but Nature finally won the day. She can be browbeaten, but we cannot conquer her.

As for bathing children on rising, especially in winter, I consider nothing more reprehensible. It is slow murder. They may be dry-rubbed at that hour, but bathed *never*. This, of course, refers to the full bath, not to the ordinary ablution of head, face, and hands. Indeed, it is my firm belief that, save dressing, nothing should be done before breakfast. The toilet completed, we should go straight to the table. In view of our actual physical condition at early morning, how any sane person can advocate the full bath and exercise before eating is a mystery.

What form of bath, then, can we take before breakfast, during winter weather, without endangering health? There are two kinds of bath which are not only admissible, but, save to actual invalids, are beneficial, viz., the *wet* and *dry friction bath*. The first is taken as follows: Procure a pair of mittens of hair, crash, or any rough, coarse material. Wring them out in cool water, and rub trunk and limbs quickly, but not with violence. Wipe the moisture with soft towel, and repeat the rubbing with dry hands. The process may be completed in two to three min-

utes. There should not be a drop of water visible upon the body. In general, I think it quite enough thus to rub arms, shoulders, and chest. The result is a delightful glow, a sense of stimulation, an agreeable warmth. There should be no delay in putting on the clothing, for the skin must not be allowed to lose the new warmth brought by the bounding blood, otherwise the tonic effect of the bath will be lost.

This manner of bathing may be considered exercise before breakfast; but, of course, I mean to be reasonable in my theory. A quick, light rubbing of the skin of three minutes' duration can hardly be called exercise. It does little more than wake up the system; but it will be found that the latter will not only respond kindly, but will be vigorous all day long. Moreover, there is no better protection against cold, no better defence for sensitive lungs. Take this form of bath for a week, then omit it, and the body will actually beg for it. In connection with the *wet friction* bath, the morning ablution of face, neck, and ears is to be followed in the usual manner. In using this bath, it is a good plan to add to the water a little aqua ammonia or alcohol. Either is cleansing and stimulating. In cases in which a decided tonic is necessary, I advise the patient to procure a pint of alcohol or cheap brandy, put it into a quart bottle, fill up with water, and add rock salt until it remains at the bottom of the bottle undissolved. A cork

perforated by a quill completes the affair. On rising, shake enough of the mixture upon each mitten to wet the palm, then rub. Water ammonia and salt, or water bay-rum and a little tincture of red pepper, and several other mixtures, will answer nearly as well. Such a bath is an excellent tonic at any hour.

The *dry friction bath* is an air-bath. Drop the clothing and expose the body to the air, meanwhile using the mittens as before, but in this case they are to be dry. Their roughness may be much increased by dipping them the night before into a strong solution of salt and water, then drying them in readiness for the morning. The tonic effect of the dry friction bath arises from the exposure of the skin to the air, followed by the rubbing.

Recently, I found that a lady patient took a sponge bath on rising. I stopped it, and substituted the wet friction bath. In a few days she told me with glee that she had never before experienced such a delicious glow from any form of bath, and that it kept her warmer throughout the day. She was a chilly subject, with rather weak heart, and could not bear the sponge bath, which is a form too chilling to be used on a winter morning. I could multiply instances in which the friction bath has been ordered in place of other ways of bathing in the morning, with an invariably beneficial effect. Either the wet or dry friction bath is a helpful stimulant when the body or brain

is fatigued. Used at night, such a bath is almost hypnotic. It is an overplus of blood in the brain which is the common cause of wakefulness at night. Friction of the body will distribute the blood, and the equalization of the circulation lulls one to sleep.

All things being equal, the best hour of the day for the full bath is about eleven o'clock in the forenoon. But in this vexed and bustling country, all things are not equal; but few individuals are so situated as to be able to take a bath at this hour. There are too many cares, too many calls upon the time. A warm bath confines one to the house for some hours, that is if personal safety be consulted.

Recently, a young lady took her bath at ten o'clock, A. M., and immediately after went a long distance *in a horse-car*. She was not insane, but merely thoughtless. The result was a lesson of illness which she will not soon forget. Unless a person be prepared to stay in-doors several hours after a warm bath, it should never, during winter, be taken before the bed hour. Immediately after the bath the safer plan is to go to bed at once. But if one chooses to remain up, a warm room and an open fire are sufficient protection.

If it be absolutely necessary to bathe during the day, and go out at once afterwards, the best defense is a cool sponging of the whole surface of the body — just a light wiping of the skin, as one would dust off a table. This will contract the blood-vessels,

and gently check the insensible transpiration which is invariably increased by a warm bath. A brisk rubbing with a coarse towel may follow. It is far safer to do this ourselves than to have the pores suddenly closed by the cold air. Upon going into the air something more than the ordinary dress should be worn. These precautions will do much, perhaps all that is necessary, to prevent being chilled or taking cold. Before dressing after a bath under these conditions, it is of vital importance to see to it that the feet are not only perfectly dry, but warm and glowing. To leave them in a damp, clammy condition will only invite a chill. The hair, likewise, should be thoroughly dry before the bather leaves the house. After the proper rubbing, a gentle fanning will soon dry it.

How warm should the bath be? Bearing in mind that it should be no more than warm, it has always seemed to me that in the case of adults the bodily sensation, within proper limits, is a better guide than the thermometer. In preparing the baths of children, the thermometer should invariably be used to decide the temperature, which should be from 90° to 95° Fah. After teething begins, it may *gradually* be reduced to 85° or 82° Fah.

A warm is not a hot bath. The latter should be reserved as a tonic, a therapeutic aid in case of great fatigue, in depression, or in the early stage of a cold.

Many persons, notably women, are in the habit of

taking hot baths in winter. They are much less safe than one of more moderate temperature, not only because of their enervating effects upon the body, especially the skin, but because after such a bath it is so easy to take cold. The belief that a hot bath creates bodily warmth of enduring nature is a costly error.

What we need in our cold winters are influences which will make us robust, increase our power of resistance, and decrease our sensitiveness. Bathing protects us by insuring free transpiration from the skin, and if of proper temperature will not subject us to the dangerous effects of cold. The morning wet friction bath is a positive shield and buckler against the effect of sudden change from warm house to cold air. The hot bath is of excellent service in case of great weariness. The body may have a plunge of not more than two minutes' duration, should be quickly and thoroughly dried, and then *at once put to bed.* It will be found that the bath has acted as a stimulant and hypnotic. This, too, is a judicious and effective means of breaking up a cold, if *only taken in season*, that is, when one first feels the chilly sensation, and the general soreness of the skin. A hot plunge, then a drink of hot lemonade, or even a glass of cold water, and the bed with somewhat more than the usual covering, especially if the body be wrapped in a warm blanket, will be pretty sure to accomplish it. A generous perspiration

should follow this treatment. It may be allowed to continue for an hour or two. Then the body should be carefully wiped, sponged, if the patient wish it (this may be left entirely to him, his sensations will be a guide), and then covered for the night as usual.

No winter bath should exceed fifteen minutes in duration, unless the physician wish a special effect, and give proper directions. Twice weekly is often enough to take a full bath at this season. Children may remain in the bath from five to ten minutes, according to age.

On leaving the bath, sensitive persons will find great comfort in having a warm sheet of cotton, or, better, of flannel, thrown over the shoulders and wrapped about the body. The first rubbing may be done over the wrapper. After a moment or two it may gradually be dropped, and the usual rough rubbing adopted.

Those persons who take a bath in cold water during the winter probably are exceptions, as they should be. For a cold bath is not safe; the reason, already given, being that it demands much more reactive power than is possessed by the majority. What it costs in nerve-power detracts just so much from the vigor of resistance to cold, which we all need during the winter season.

In winter, a bath should not be taken if the body be much fatigued. Under this condition the heart is

as weary as the body. Extraordinary call upon its power would then be a hazardous experiment. Even on the following day there would be unusual exposure because of increased difficulty in keeping warm. This is notably true if a person be delicate, or if the heart, lungs, or other organs be weak or sensitive. The exception may safely be a plunge of one or two minutes' duration into hot water, attended with the precautions already mentioned.

The forenoon hours are the proper time for bathing children. If the hour be inconvenient, unless they are too tired, they may be bathed about fifty or sixty minutes before the evening meal. Food must not be eaten directly after a bath, and it need not be said that neither adults nor children should bathe directly *after* eating, whatever be the season. This would be especially dangerous in winter.

It is best to bathe children before an open fire; but they may be bathed in an adjoining bath-room, if the latter be sufficiently warm, and if when taken from the bath they be wrapped in flannel, carried to the vicinity of a fire or open register, and there be dried. There, too, they should sit, well wrapped, while eating their supper; but not so near the fire as to become unduly warm. After a bath, children react with less ease than adults, and hence require especial care. They should not only be rubbed dry, but until the skin

blushes rosy red. Particular pains should be given to drying their hair and warming their feet.

As regards the various forms of bathing, I have thus far alluded only to the common whole bath. In another place has been mentioned the protection and comfort afforded by the instantaneous foot-bath in cold water, followed by brisk rubbing. The glow which follows not only gives comfort during sleeping hours, but adds greatly to our defense against cold during the day. Many colds are taken through the feet. Chilly sensations take possession of the body, most insidiously, by way of the lower extremities. Some individuals are annoyed even in winter by perspiration of the feet, and almost invariably their feet are cold as well as damp. The cold foot-bath will be one help to them. Beside this, if the feet be wiped daily with a little tincture of belladonna, in most cases the sweating will soon subside or become much lessened. The same advice will apply to moist hands.

I must confess to a prejudice against *indiscriminate* use of the *Turkish bath* in winter, especially in the rigorous climate of the Northern States, unless one can at once go to bed under the same roof. To take such a bath in cold weather, and immediately after go home through a freezing air, is very hazardous, save in the few exceptions which are admitted by even stringent rule.

Under the advice and personal direction of a physician, the Turkish bath, as I am well aware, has often accomplished a good and desired purpose. My objection chiefly refers to unadvised use of it in winter. While it lasts, it is a luxurious delight; but the condition in which it leaves the bather is what makes it dangerous. Notwithstanding the cold affusion which follows the main bath, the body is left in a state of active perspiration, which lasts so long that the majority have not time to wait for its disappearance. This is what makes the bath questionable in winter. I have no objection to offer to it when taken in summer, if due care be exercised and the bather be strong enough to bear its exhausting effects. I have known individuals to faint while the bath was in progress. Delicate and plethoric people, likewise those whose lungs or hearts are weak, should never make use of it. It is true there is a great temptation in it, for its temporary effects are delicious, and it leaves the skin admirably purified. Indeed, during a first experience in a Turkish bath, one is involuntarily reminded of Sidney Smith's letter from a hot German bath. "They have already scraped enough off me," he wrote, "to make a curate."

But, recently, a well-known gentleman of Boston invited a friend to go with him to see how quickly he would rid himself of a cold. "I am perfectly stiffened by this cold," he said. "Nothing but a

Turkish bath will break it up." It was winter season, for it is then that people are induced to use this bath as a remedy. The gentleman took his bath, and for nearly a month was confined to his chamber. This has been my invariable experience when I have tried to leave a cold in a Turkish bath. The cold was always worse; and I would earnestly impress upon my readers the danger of this form of bath in winter, unless it be used in a mild climate, or under the eye of a physician. The Russian bath is less known in this country, but the same dangers attend its use.

Weak kidneys and bowels are particularly sensitive to cold, and much harm comes to these organs during the cold season, if the body be not sufficiently protected. I should have said, under the subject of clothing, that this portion of the body, if weak, may be defended by a flannel bandage. But increase of tone and of power of resistance may be communicated to the abdominal organs by means of local bathing. Firstly, by the wet friction bath, during which rubbing should be as vigorous as the skin will bear. Another excellent means of increasing the vigor of this locality is the *sitz-bath.* The water should be simply cool, that is, five or ten degrees lower in temperature than the body, say 88° to 93° of the thermometer. The chilliness of the tub may be avoided by laying a small blanket over the back of it. The knees must be covered with another blanket. The

stay in the bath should not exceed five or ten minutes in duration, and should be followed by a brisk rubbing. Rub until the skin glows.

In this place, too, may properly be mentioned the benefit of water in cases of sore throat. At night lay upon the *front* of the neck a wet compress of old cotton (muslin it is called in some localities). It should be dipped in cold water, and then be wrung out as thoroughly as possible. Let it be in three or four folds, and long enough to reach from ear to ear. Over this apply a layer of raw cotton or batting, an inch or two in thickness, and wide and long enough to overlap the wet compress. Over this a piece of water-proof material,— water-proof paper, oiled silk, or thin rubber. The whole forms a water poultice, and should be bound on with a bandage going around the neck. The effect will be a local sweating, which will relieve the congested vessels of the mucous membrane of the throat. The poultice may be repeated for two or three nights. When dry, the compress should again be wrung out in water. If the person wearing it go out on the following morning, the throat should be washed in cold water on rising, and again just before leaving the house. While taking this treatment, however, it is better to remain in-doors, and certainly so if one be delicate. The same form of poultice is excellent in case of rheu-

matism of a joint, and in diarrhœa, in which case it is applied to the abdomen.

In sudden attacks of croup or convulsions in children, a very hot bath is often a means of saving life. The doctor should at once be called, but meanwhile the child should be placed in the hot bath. Both the strangulation from the croup and the violence of the convulsions will probably be relieved by the relaxing effects of the hot water. In the convulsions, it is always desirable, during the bath, to lay upon the head of the child a cloth wet with cold water.

In conclusion, the remark may be repeated,— that the majority of people do not realize the power of water for good or evil. In winter it may give vigor and strength, or it may be so wrongfully used as to expose one to the danger of contracting the worst forms of lung-disease. In the unequal distribution of blood which is the result of a cold bath, or of a warm bath followed by exposure to cold air, persons who have sensitive lungs are in imminent danger of bringing on consumption. Those whose hearts are weak or unsound are especially endangered by carelessness in bathing; for the heart cannot bear the strain and shock which are caused by a sudden change in the circulation, such as may easily be set up by a rapid chilling of the skin. A bath should invigorate, not depress and weaken. It should be so taken as to leave the skin in a glow,

and thus invigorate the internal organs by giving the blood a bounding speed from within to the surface of the body. The opposite condition — a feeling of lassitude and languor — is one which should be most carefully avoided, especially by those whose lungs, throat, and heart are sensitive to any change in the temperature of the body, or, indeed, who have any organic delicacy.

It must be remembered that a weak organ is easily deranged by an over-supply of blood. How this may come about has already been explained. But let me make it clear that a rush of blood to one organ may paralyze the central organ — the heart — if it be weak. Suppose, through a sudden chilling of the skin, that the lungs become oppressed by too much blood. In this condition of things, the heart finds it much more difficult to send on the blood, because the quantity in the lungs acts as an obstacle. If, then, the heart be weak, this sudden call upon it for increased vigor may deprive it of what it already has, and it stops — paralyzed. Or, meanwhile, the blood in the lungs may cost the patient his life by preventing respiration. Death is thus caused by a tidal wave of blood, which makes powerless the organ it has engulfed, or indirectly paralyzes the heart, as just explained. The same process, with equal or greater danger, may take life through the brain, or cause a mortal disease of the kidneys.

If the evil effects of carelessness in bathing be less vital than this, still, a constant succession of them weaken the system, and render it less and less able to withstand the vicissitudes of our winter climate ; so that when actual illness does come it meets with but feeble resistance, and the result is too often fatal. And yet this may all have been through ignorance rather than carelessness.

In case of the very strong, it is too true that as the pitcher may go once too often to the fountain, so may a strong man resort once too often to his cold bath in winter.

Before leaving this subject, I may mention the oil bath. This consists of a warm bath, followed by inunction of olive- or cocoa-oil over the whole body. It should be done by a strong hand. It will add not only to physical power, but will increase the weight of the body.

In any form of bath, if the rubbing be administered by another, the benefit of the bath will be increased tenfold. Delicate people are often chilled by their bath, simply because they have not sufficient power to rub themselves into a glow.

CHAPTER IV.

INATTENTION TO PULMONARY FOOD.

"Our own breath is our greatest enemy."

LEEDS ON VENTILATION.

THE heading of this chapter is suggested by the story of the physician who had vainly tried to prevail upon his patient — a nervous, hysterical lady — to admit fresh air to her chamber. He never failed to find the atmosphere of the room close and sickening. The patient's hobby was a search for the cause of her low tone of system. Her physician argued in favor of fresh air; he rung all the changes upon the effect of vitiated atmosphere. But nothing could induce that woman to have her window opened. At last, in desperation, the doctor, one day, said, "Madam, I have concluded that the whole cause of your condition is *dirty food*." Being extremely fastidious in regard to her meals, the patient for a moment was speechless with indignation, but finally burst out with, "Doctor, what do you mean by such language? *My* food dirty!" "Oh!" he said, "I did not mean to refer to the food you eat. That, of course, is in proper condition; although, if it were not

quite clean, it probably would do you no harm. I was alluding to the food you give your lungs, and through them to your blood." With all the earnestness of a conscientious man and physician, he then again explained to her the condition of the air she constantly inhaled. How it reeked with carbonic acid, decaying matter, personal effluvia; how unwashed and foul it was, and expressed his astonishment that she, a dainty, fastidious person in other respects, could breathe over and over again the air which had once swept out her lungs and those of her attendants. The patient became so embarrassed as to be unable to reply. But the startling revelation to which she had listened converted her. The doctor never again had occasion to allude to the matter.

The anecdote contains the meat of this chapter, but the subject may be made clearer by more detail. Before I enter upon it, however, I will ask the reader to bear in mind that I am considering this matter not as one of the dangers of the whole year, but as a danger of winter. In summer, many of the conditions to which I shall refer do not exist.

Human beings, as well as fish, live, move, and have their being in a fluid. That in which we find fish is visible, and its slightest impurity noticeable. Not so the fluid in which we live. It is invisible, and, in a general sense, so are its impurities. Eyes being of no use here, the sense of smell, if properly re-

garded, will be our protector. When the air of our rooms is foul, when drains are imperfect, when any impure thing taints the atmosphere, the sense of smell gives us warnings which should be religiously regarded, and never neglected.

The air in which we live, and which we inhale, is composed, when normally pure, of about eighty parts nitrogen, about twenty parts of oxygen, and a small quantity of carbonic acid, say about four-hundredths of one per cent. When absolutely pure, the air of course is as absolutely free from this poisonous element. Our health depends upon keeping up the twenty per cent. of oxygen and keeping down the carbonic acid to its lowest possible minimum. An increase of this gas to five or ten per cent. would be fatal to life.

When the blood leaves the lungs, it is in the condition called arterial; that is, it has been purified by the air, or aerified. And the name artery originated in the fact that, until the time of Galen, in the second century of our era, the blood-vessels leading from the lungs and heart were supposed to convey air directly from the windpipe, and air only, because after death they were always found empty. It was thought that the veins, the vessels which bring the blood back to the heart and lungs, were the only channels of the blood, for after death they were always found full.

The blood carries myriads of small bodies called blood-corpuscles, which, with the exception of a few white ones, existing in the proportion of about four to one thousand of the red, have a color which is bright red when the blood is pure or arterial, purplish or dark crimson when the blood is impure or venous. These bodies have aptly been compared to boats. When the blood leaves the lungs, these boats carry a mixed cargo, an important portion of which is oxygen. This they discharge as they pass through the canals of the body, some stopping here, some there; but they always exchange it for an equal load of carbonic acid. This carbonic acid changes the color of these dainty boats from bright to dark red. When they reach the lungs again, they expect to find a new cargo of oxygen, and likewise to become purified and restored to their original brightness. Consequently, when the air inhaled by the lungs is once in the air-cells, which cluster about the finer bronchial tubes likes grapes upon their stems, the pure air finds a quantity of carbonic acid which has been brought by the boats that have just arrived from the rivers and canals of the body.

By a wonderful process of which gases are capable, the carbonic acid from the boats and the oxygen from the inspired air both pass through two exquisitely delicate walls which separate the blood in the vessels from the air in the air-cells of the lungs, and exchange

places — the air in the lungs taking the carbonic acid from the impure blood, and becoming itself impure; the blood-corpuscles, or the boats, taking the oxygen from the pure air (*if only it be pure*), and thus becoming purified. Where this barter takes place, the air-cells lie in a perfect mesh of the most delicate vessels conceivable. The walls of each are so exceedingly thin that the transfusion or passage through them of the two gases is made possible. But for this delicacy of construction, the exchange could not take place. The freshly-laden boats now start on a new trip, their places being instantly taken by others. The impure air is exhaled, and the next inspiration sends fresh air to the air-cells and the waiting boats. And so this wonderful process of exchange goes on day and night, whether we are sleeping or waking.

Oxygen is ever present in the out-of-door air. Whence comes the carbonic acid? Much of it we make ourselves. Every breath of pure air which we inhale is laden with its twenty per cent. of oxygen. Taken by the blood from the air-cells, as already explained, it is carried throughout the body, everywhere meeting with carbon, which is a result of decomposition and waste in the body. A certain proportion of the oxygen unites with this carbon, thus forming carbonic acid, and thus, too, it is said, creating heat by the chemical union of these two bodies. This new compound is a deadly poison, and we exhale it with the breath into

the air about us. Out of doors it is quickly diluted and disposed of by the pure air. But in the house, unless we use constant care, this vile carbonic acid is taken back into the body, where it not only does much harm, but prevents the elimination or discharge of the carbonic acid which has already accumulated in the blood. Of the air which has once been breathed, one-fifth of its oxygen has been replaced by its equivalent of carbonic acid, and about one-twentieth of the oxygen remains in the system, so that rebreathing the same air four or five times in succession deprives it of *all* its oxygen, and it is then incapable of sustaining life. Any room, however imperfectly it may be ventilated, would receive in winter, through crevices of doors and windows, and even through the walls, sufficient fresh air to give a certain percentage of pure oxygen. But in such a room the carbonic acid would constantly increase, and, having no means of escape, render the air more and more impure.

It may be asked: Why is there so large a proportion of nitrogen in the air, and what is its use? Its purpose is dilution of the oxygen. Pure oxygen is so exhilarating that in an undiluted form it would soon destroy life. We find almost precisely the same quantity of nitrogen in expired as in inspired air, so that it seems to be merely a vehicle for oxygen, just as water serves as a medium for a small quantity

of a strong medicine. This, parenthetically, is all that need be said about nitrogen.

Unfortunately for those who shut out the fresh air, carbonic acid is not the only substance exhaled in the breath. There are organic matters, salts, cells from the mucous membrane, odors of certain drinks, and articles of food, all of which become more and more decomposed; the air also contains fibres of wool, cotton, and linen, human hair, scales from the skin, bits of food, coal, etc., all of which render it more vitiated and foul.

The normal amount in the air of carbonic acid being .04 of one per cent., if it increase in our rooms to one and a half, two, or three volumes, headaches and vertigo are caused. But, as just mentioned, there are organic matters present, and they seize upon the oxygen, which in this way becomes still more decreased. An undue amount of carbonic acid also prevents exhalation of the same impurity from the body, and this interferes with nutrition. People who breathe such foul air usually are sedentary. They lose their spirits and appetite, and become pale, without knowing why.

In sick-rooms, unless great attention be paid to securing a supply of fresh air, the atmosphere becomes especially vitiated. And the more impure the disease, as small-pox, gangrene, pyæmia, so much the more

foul does the air become, notably in winter, when windows are not freely opened.

In hospitals, the very walls become laden with impurities. "Bakewell," says Parkes, "collected in a small-pox hospital, seven or eight feet from the floor, dust which contained scales of skin thrown off by the patients." The same condition of the air is found in the rooms of scarlet-fever patients. It is difficult to remove these poisons even by free ventilation, and they are what spread disease. Exhalations in typhoid fever and lung affections also clog the air.

A square yard of a Paris hospital was recently washed, and the liquid wrung from the sponge carefully examined. In it were found animalculæ in abundance, also skin-scales and even pus globules. All of these might have been inhaled.

Many statistics show that consumption and other lung affections are especially prevalent where ventilation is poor; that ships, factories, hospitals and the like, in which many individuals are assembled, and where ventilation is imperfect, create much disease of the breathing organs. On the other hand, when these places have been supplied with pure air, the sick- and death-rates from lung disease show remarkable decrease.

It is undoubted, that affections of the lungs, notably consumption, find their origin in inhaled air which is laden with organic vapors and particles arising from the human body.

Bronchial affections, "colds," etc., are generally attributed to change of air, draughts, etc. In many cases, these are their cause; but it should be known that impure air, inhalation of dust, gases, smoke, etc., will produce similar results. Illuminating gas is likewise an enemy. Parkes supposes that the carbonic acid and carbonic oxide from the burning gas, being quickly diluted, do less harm than the solid particles of carbon and sulphurous acid, both of which cause headache, paleness, and lassitude.

In addition to all this impurity is the sewer-gas which penetrates into many houses. Without the slightest doubt, it causes diarrhœa, vomiting, loss of appetite, slow fever, diphtheria, scarlet and typhoid fevers. These dangerous elements of the air of the house will again be noticed in another place.

In order to perceive the odor of organic matter, one must enter a room from the fresh air, because after a few moments the odors become imperceptible. This is an important matter. If we heed it, and at once obey its warnings, the sense of smell is our faithful friend. Neglected, it soon tolerates the foul smell, and we become unmindful of it. There is subtle danger here.

Of course, only the out-of-door air possesses the normal purity. Every room contains some impurity; but the difference between a ventilated and unventilated room is immense. Probably each individual in

a given room needs at least 2,500 cubic feet of fresh air every hour. Writers on hygiene differ somewhat as to the requisite quantity, but this is the smallest amount compatible with comfort. In sick-rooms, the supply should be greater according to the case. A bad case of small-pox should have a supply equal to 4,500 cubic feet each hour.

Suppose a room to be twelve feet square and ten feet high; then it contains 1,440 cubic feet of air. In order to keep the atmosphere of this apartment at anything like a normal condition, it must be completely renewed every half-hour, or say every forty minutes for each person who occupies it. Now, a room twelve or fourteen feet square is about as large as the average living-room of ordinary houses. But fancy how many, many houses there are which do not possess one room of this size, and whose living-rooms and chambers each shelters from three to five persons. How quickly they consume the pure air; how quickly it becomes impure! Suppose their room to be eight by ten feet and eight feet high. It contains 640 cubic feet of air, not quite enough fairly to serve one individual fifteen minutes. Suppose this room contains a father, mother, and two children, the latter being considered equal to one adult. It will be seen that these three adults use up the air of their room in about five minutes. What must be the condition of the atmosphere of this room in the course

of an evening or night, unless fresh air comes in? But, you will say, see how many stalwart men there are among the laboring classes. Yes; they, many of them, are constantly in the open air, and are thus partly compensated for the effect of their dangerous stay in-doors at night. But look at the pale mother and sickly children, and remember that one-quarter of all the children born *die before they reach the age of five years*. What is the main cause of their death? First, bad air; secondly, bad air; thirdly, bad air, which brings on diseases almost without number, especially pulmonary affections.

Take a larger room — one in a house in which wealth is everywhere evident. The room is fifteen feet square, twelve feet high, and contains 2,700 cubic feet of air, or enough to serve one person about one hour. At the end of that time, will it be renewed? Perhaps. But the luxurious have their double windows, their weather-strips, heavy curtains, and portières. They actually spend money to keep out pure air, while the poor man in his house of imperfect carpentry cannot prevent the inroad of fresh air in all directions, but this is far from enough, because used up so rapidly. Fortunately, however, in the better class of dwellings, open fires can be afforded, and they are a saving clause in the health of any household.

Yet, in spite of wealth, its possessors are notoriously sensitive to the changes of winter weather. In spite

of their open fires, they do not live in pure air; for while, on the one hand, they have their fireplaces, on the other, they have their double windows, heavy curtains, and other ingenious devices for shutting out their best friend, which they deem their worst enemy.

Think, too, of the air of church, theatre, and crowded parlor. Go into such from the fresh air an hour after the company has assembled. How heavy the air with personal effluvia and re-breathed breath. Pah! these delicate women have no thought of what they are doing. Offer such an one a cup of ditch-water; would she drink it? Would she drink it if it contained even a speck? No. And yet think of it,— in unventilated rooms and crowded assemblies, we inhale dirty air — air which has washed out other lungs than ours, some of them probably in a state of disease! Such air contains personal impurities, particles from the lungs, uncleanly odors. Such air drawn into sensitive lungs — lungs which are only waiting to spring into inflamed conditions — creates disease.

Many physicians believe bronchitis and consumption are not infectious. I do not agree with them; for diseased particles (germs, as they are now termed) from the lungs of one person, if inhaled by another pair of lungs, without the slightest doubt can set up an inflammation of a similar nature. Examples of this transmission of lung disease are not lacking. Indeed, it is but recently that an acquaintance of mine,

a lovely young wife, in whose family there was no history of consumption, devoted herself so unremittingly to her husband, who was ill of this affection, even occupying the same apartment at night, that she, a blooming, healthy girl, contracted and died of the same disease, a sacrifice to affection. Let who will object to this conclusion; nevertheless, we know that the air of a consumptive's chamber contains diseased germs from the patient's lungs. Would it then be common sense to neglect the most thorough ventilation of this room? In any case, if he inhaled only pure air, the patient would have a better chance of living down the disease.

Indeed, if money were no object, I would send every patient who had weak lungs into the open air. I would give him a constant succession of sea-voyages; send him across the country on horseback or in an open carriage, and advise tent-life wherever possible. Wherein lies the benefit of tropical air for a consumptive? Is there medicinal virtue in it? If we except the crowded cities, is air purer in one place than another? Not at all. The real use of a soft air is that it allows the patient to live out of doors all day, and admits of wide-open windows at night. If in such a climate the weak lungs cannot have the sunshine and the life-giving influence of air under the sky, they may just as well be kept at home. The objection to our climate is that its sudden changes

from heat to cold, from dryness to chilly dampness, are deadly in their effects upon the exquisitely sensitive blood-vessels of the mucous membrane of the lungs.

When Gulliver was in Brobdingnag, he was disgusted by the impurities of the skin of the inhabitants, who marvelled at the fineness and delicacy of his. But when he lived in Lilliput, a frank and friendly midget informed him that only the urbanity of the Lilliputians enabled them to endure the sight of his coarse and filthy skin without making their disgust evident, and yet Gulliver was an extremely cleanly man. Herein lies the secret of our indifference to impure air. If we could but *see* what it contains! What need, then, of books and lectures upon the best means and the great necessity of purifying the air of our houses?

If the Lilliputians of our households could but analyze bodily sensation, doubtless they would announce impure conditions of the atmosphere of a room long before the adults notice it, for their little mouths are near the floor, and, unless the whole air of the room be pure, they breathe an atmosphere far different from that inhaled by us, whose mouths are three to four feet higher than theirs. There are layers of air in rooms as there are layers in the out-of-door air. In those near the floor are the carbonic acid and heavier impurities, and these the helpless chil-

dren inhale more abundantly than we who occupy a higher position.

To return, now, to the air of churches, theatres, and other crowded assemblies. Such air is not only notoriously impure (for who ever saw a sexton or janitor who knew how to ventilate properly, and not overheat), but it creates danger even beyond the local effects of its foulness upon the lungs. It lowers the physical tone of every person present; for, first, it prevents the escape of impurities from the blood, and secondly, it offers to the blood material which is simply poisonous. The atmosphere of a crowded place may even cause typhus fever. But I am speaking merely of the unhinging effect of the air of our ordinary assemblies. It not only interferes with our enjoyment of a sermon, a play, a concert, but it lets us down so far from a well-toned condition, that our power of resistance to cold is lessened, and when we go out into the winter air we become very easily chilled, and much lung trouble is the result. For we are not exposed to this unnatural influence once, merely, during a winter, but several times, more or less, every week. "The clergyman," says one caustic writer, "expends mental force in vain if he thinks to contend with foul air, a very device of the evil one."

I may be mistaken, but it has always seemed to me that the air of churches is more impure than that of

any other public building, not excepting even theatres. For, although the latter are used several times weekly, they have the benefit of a daily airing, while churches, in general, are opened to the air but one day in the week, (Sunday does not count,) and, of course, at the close of morning and evening service, especially the latter, the sexton nimbly locks up his church, when he should throw open every window and let the keen winter wind sweep out the building before the foul air, animal vapor, and particles, with which it is laden, settle upon the carpets, cushions, and walls, in addition to former accumulation. The ordinary Saturday sweeping and airing comes too late. Monday were a better day for this work. Saturday should be devoted to dusting and ventilation.

Every reader has experienced the sleep-inducing effects of the bad air of public buildings. How else do consumption, pleurisy, and pneumonia find their origin than in the neglect of this aerial hygiene? Either the quality or the temperature of the atmosphere of these places is at fault, or both. The former, if abnormal, is more deadly than too much warmth; for that is not a subtle thing which becomes difficult of recognition. We quickly feel its discomforts, and when we afterwards encounter the cold air, if wise, we so protect ourselves as to avoid a chill. But bad air becomes bad before we know it, and too often is allowed to remain foul long afterwards.

Benjamin Franklin once wrote these wise words: "After being in impure air, many persons find themselves affected by that febricula called in England 'a cold,' and, perhaps, from that imagine they have caught cold by going out of the room, when it was, in fact, by being *in it*." Franklin would not have believed that one hundred years later people would still deserve his criticism.

God gives us pure air. Is it not a sin and a shame that we do not keep it pure? Think, too, of the sick, of the delicate, of the children who are confined to the house. They are mainly helpless. For their pure air they are dependent upon the foresight of others, and it is just as cruel to keep it from them as it would be to deny them food, and almost as dangerous. *Their lives depend upon it. They die for want of it.*

How true is my French proverb: "On ne meurt que de bêtise." Stupidity is at the bottom of the whole question. Would a mother allow her child to inhale a gas impregnated with arsenic? But she allows him to inhale gases nearly as poisonous, but which do not kill quite so rapidly, simply because the blessed, pure air *will* get into the house in quantity sufficient to dilute in some degree the atmosphere of the house, and so the child dies only slowly.

When we sit down and calmly think this matter over, is it not perfectly astounding that intelligent, civ-

ilized, fastidious human beings are willing to breathe the nasty air which is found in the majority of our houses and public buildings?

Again, it must be remembered, that, added to the impurities which we put into the air are the smells from the kitchen, the gas backing into the house from the sewers, the detritus of illuminating gas, etc. We have not to go far for a key to the large death-rate of our cities. "Died for want of breath" is a jocose saying, but it contains a terrible truth.

The worst of all is that the majority of those who spend most of their time in unhealthful air lead sedentary lives, and, therefore, are not only exposed to the influences of bad air, but are less able to meet them than if they had the compensatory aid of many hours spent out of doors. Moreover, these are the very people who object to the admission of fresh air. They fear it, and prefer their slow poison. I suppose this is one of the most vital subjects which can be considered, for the amount of popular ignorance in regard to it is something beyond computation, and its results are deadly.

One element of the pulmonary food in many houses is sewer-gas, as already mentioned, and, of course, its dangers are a hundred-fold greater in winter than in summer. Enter a house thus infected, and the nostrils, filled with the sweetness of fresh air, instantly remark the vile odor. Remain a half-hour in this atmosphere,

and what we call "toleration" will have become established. The sense of smell no longer notices the odor. This is a danger against which we must defend ourselves by cultivating this invaluable sense. If we do not respond to the warning given us by the nose, it soon ceases to give it, and we become accustomed to the bad smell.

The other day, I was called to see a lady who had taken a suite of rooms in a fine house. A most disgusting smell saluted me in the front hall. The lady's symptoms were such as led me to say: "I cannot help you until the drainage of the house is repaired." She had noticed the odor, and on complaining to the landlord was told that it came into the house only on certain days, when the mouths of the main sewers were uncovered by the tide-water and the wind was from the east (this is a common explanation of your typical landlord), and he refused to make an examination. I advised the lady to refuse to pay her rent until he had done so, and likewise to threaten him with the Board of Health. She did so, and he succumbed. When everything had been torn up, the most fearful condition of things was found. Pipes decayed, stopped up, leaky. Suffice it to say that beneath the basement floor was found a mass of filth some inches in depth. The case is a type of many similar.

But where there are no leaks; where everything is

sound; where the water-closets and permanent wash-stands are properly trapped, sewer-gas will force its way into the house. The plumber's calm assurance that traps are a perfect protection, is as true as that India-gauze will hold water. By absorption, if not directly, gas will pass through any trap in existence. The only sure protection is a ventilating shaft, which may likewise serve as a waste-pipe. This should be of iron, (everything else breaks or decays,) and be carried up through the roof of the house. Some advocate its introduction into the chimney. If the latter be constantly heated, well and good; if not, then gas will sometimes come into the house. A trap should be put into the waste-pipe, just outside the wall of the house, and this should be tapped by another ventilating shaft, which may run up the back of the house. Both ventilating shafts should receive a supply of pure air. Protection is then as nearly perfect as it can be; but, in my opinion, permanent wash-stands should never be placed in any sleeping-room. The old-fashioned bowl and ewer are the only safe arrangement. I merely touch upon this topic. Another book of this series will give more details.*

In regard to the physical effect of sewer-gas, particularly in winter, when windows are closed, it may be briefly said that it is the cause of headache, nausea,

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* See "Our Homes," by Prof. Henry Hartshorne.

frequent diarrhœa, the deadly diphtheria; and facts show that typhoid fever stands in close relation with imperfect sewerage. Many persons may be exposed, and yet escape; but many others, especially those whose systems are in a sensitive condition, will contract the disease.

This source of disease was recognized even so long as four centuries ago. In the quaint dictum of the School of Salerno, published in 1480, occur these lines:

> "Let air you breathe be sunny, clear, and bright,
> Free from disease or cesspool's fetid blight."

In this country, I believe a frequent cause of sickness, at any rate of irritation to the lungs, is the woollen carpets which are spread in every room. Probably they will never be banished from the house, but they should be. They are carefully swept, it is true; this, however, not only fills the rooms with impure dust, but woolly fibre as well. In fact, one cannot walk across a carpet without raising both dust and fibre, which, of course, are taken into the lungs. When the carpet of a large room has been danced upon for hours, the amount of fibre inhaled by every person in the room must be large. With a magnifying-glass, carefully examine the dust of a carpeted room, and wool-fibre will be found in abundance. Now, it is impossible to deny that, in the course of years, such

fibre will make some lungs sensitive; and I know it is a sad irritant to lungs originally so. Bronchitis or throat affections following a dancing party in a private house, probably are oftener caused by carpet-fibre, decomposed dust, and skin-scales which have been shaken out of the loose meshes of the carpet, than by chill. Then, too, the carpets of chambers whose windows are not raised at night must become saturated with personal effluvia, especially in case of sickness; and they are a very hot-bed for the retention of contagious diseases. Some carpets are not beaten in years. What must their real condition be? The only manner of carpeting a floor, and by far the most tasteful, healthful, and enjoyable, is to have loose rugs. Let them be Turkish, Persian, Brussels, two-ply, what you will, but have rugs on a painted or a stained and shellacked pine, or upon a chestnut, oak, or black-walnut floor. When sweeping-day comes, they should be beaten out of doors, where their impurities and loose fibre go to the winds. They are always sweet, do not retain odors, and, if Turkish rugs of fair quality be purchased, in the end they will prove far more economical; for they will outwear any carpet, will not fade; they beautify any room, need never be cut; they rid the housekeeper of the dreadful tack-hammer, and, best of all, make the house healthier. In case of sickness, they may be quickly removed without noise. In summer, the

pretty wooden floor may be left bare, and the rugs packed away. The chief objection to rugs is that "the floor has to be swept so often" (!). The only answer is, if carpets will keep out dust, let us have them by all means; but I prefer to know when there is dust on the floor, for in that case I am pretty sure it will not long remain. The delight of being rid of the necessity of taking up and putting down carpets, cannot be estimated until experienced. The rule should apply to chambers as well as to day and evening rooms. In a family which includes delicate lungs, the change from carpets to rugs will produce an immense benefit.

There is another form of house adornment which frequently is the source of a still greater and more absolute danger—colored wall-papers. Until recently, it was supposed that only those papers which had a greenish tint contained arsenic; but it has been discovered that *papers of any hue* may be tainted by this virulent poison. Not long since, while purchasing some lovely Morris patterns, the question of arsenic came up, and the dealer was requested to have the chosen papers analyzed. The color which alone was supposed to contain arsenic, did not enter into the composition of either pattern, but *every one* of the papers was found to contain arsenic, and new papers had to be chosen. The examples of the sickening and poisonous effects of arsenic from wall-papers

are so common, and its deadly nature is so well known, that no cases need be given here. Suffice it to say that the very greatest care should be used to secure perfectly innoxious papers. If arsenic be present, it escapes from the paper into the air of the room, is then inhaled, and is often the cause of maladies so mysterious in their nature, that, unless the physician include the wall-paper in his search for the cause, he, too, may be baffled. Since arsenic is now used in crimsons, purples, browns, yellows, etc., the only safe rule in buying is to insist upon having the chosen colors tested for arsenic, and any well-educated doctor can readily apply what is known as Reinsch's test for arsenic. It may be said that this is not a danger peculiar to winter. True. But in winter, for obvious reasons, arsenical wall-papers are more dangerous than at any other season, especially in houses which are not properly ventilated.

I must not forget to mention the effect of foul air upon the central organ — the heart. If the blood be vitiated and overladen with carbonic acid which cannot escape, the heart, whose vigor and regularity depend upon pure, fresh blood, labors under immense difficulties. It soon becomes fatigued, and thus reduces the general vigor of the body. If it be naturally weak or diseased, so much the greater is the strain to which it is subjected. Unless the blood were constantly refreshed by pure air, palpitation

and irregular movement would be the result, even in a healthy organ. How delightful is that first, great, deep inspiration which we involuntarily take on going from close rooms into the open air! And yet it rarely teaches the needed lesson. A person wonders why his head throbs, why he is conscious of his heart, why he feels depressed, why his mind will not obey him, when, probably, the simple reason is that *he is inhaling foul air.* If his stomach have lost appetite, his lungs have not, for every voice in the body is pleading for a meal, a mouthful, even, of fresh air.

A few words concerning *night air*, of which so many people live in such needless fear, that Dr. Ingelhaus calls their affection *ærophobia.* It is a very common belief that night air is unhealthful, but, as Florence Nightingale sensibly remarks, "We must breathe night air at night;" and she might have added, if pure night air be shut out, then we breathe foul night air. The popular idea that night air is impure and unhealthful is an error which costs life. Méné found that the night air of Paris actually contained less carbonic acid than day air. We all know how sweet and fresh the air of summer nights always is. Why should it be less so on a winter night, when the vigorous winds are renewing and refreshing it?

The *malaise* and unrefreshed look of those who

sleep in absolutely close apartments, tell their own story. A certain amount of fresh air is constantly entering our house through window- and door-joints, and through the walls; but this is not a tithe of the amount we require. People think if a chamber be cold, the air must be pure. They think, too, if a room be large, that the window need not be opened. It is true, that more carbonic acid escapes from the blood when the temperature is low than when it is high; but where is this foul gas to go, unless there be ventilation? This theory is all wrong. A small, warm room, in which a window is raised, never so little, is more wholesome than a large, tight room which is freezingly cold. Apply the popular theory to ditch water. Is it cleaner when cold than when warm?

Apropos — how very careful people are to obtain pure water, how indifferent to pure air, although one is not less important than the other. To eat or drink dirt might do no harm, but to inhale foulness is to play with poison.

It is hardly necessary to remind readers of the peculiar odor so very common in chambers which are kept closed all night. This remark refers to any chamber, good, bad, or indifferent, which has no ventilation, but especially to servants' rooms, regarding which many housekeepers are singularly careless, never asking from year's end to year's end whether they are properly aired. Servants, of course, wish to keep

their chambers as warm as is possible, and so do not open their windows even during the day. There should be more care exercised in this direction; for the vile air which thus accumulates may affect that of the whole house.

A realization of what it means to sleep in unventilated rooms, would open every chamber to the pure air of night. There is less resistance during the hours when we are perfectly passive. We lie some feet from the floor, and, unless fresh air be entering, the detritus in our own expired breath falls upon and around us, and we rebreathe and breathe again what is mere decomposition and poison. It is not our fault that we do not suffocate, for every window and door has been closed with the intention of keeping out the pure air. What wonder that disease is so common.

In winter, the seeds of many a fatal lung affection are sown in unventilated sleeping-rooms, and this not in a metaphorical, but in a literal and physical sense. If the lungs be not directly irritated, the general tone of the system is so lowered by this foul air that it cannot, and does not, successfully meet the rigorous trials of our winter weather. In unventilated rooms at night, the strong grow weak and the weak become more feeble. It is useless to point to this or that person who has reached a vigorous old age in close rooms. Everything has an exception.

Statistics show that where war has slain its thousands, bad night air has slain its tens of thousands. Then do not fear, but welcome the pure air of night. If you have slept with closed windows for years, do not at once throw them widely open. The system cannot bear sudden wrenches and strains. Physical change must be gradual. Moreover, in winter, the window should be raised but little. Besides, the body should never be exposed to a draught of air during a cold night. I know that this rule is broken by some who are over-enthusiastic in their determination to have fresh air. But the practice is a very dangerous one. The air should at first be admitted in small quantity, and be increased as the body becomes accustomed to the change. On winter nights, we never need a greater inflow of air than will serve to keep in gentle motion the formerly stagnant and moveless atmosphere of the chamber. It should have the motion of a quiet, placid stream; for at this season a cold current, whose movement is rapid, is unsafe.

There must be a cause for all disease. So far as the laity are concerned, this cause is shrouded in mystery; for, as regards laws of hygiene, there is a woful ignorance among them. It is perfectly true that disease, or a tendency thereto, may be inherited. But suppose a child to bear the signs of inherited ailment,— if this child be given the very best means for improvement and physical development, does any

sane person imagine that it will not gradually overcome the weakness? What should these means be? Good food, proper clothing, sensible guidance, plenty of fresh air, in-doors and out. In this way, and in this way only, can disease be stamped out. There should be no mystery in the cause of sickness. Not once in a thousand times does it arise from anything else than some error in the manner of living. We are fools and blind! In one day we give more thought to our outward appearance and the decoration of the house than we give in one year to the simplest laws of hygiene. Human beings wish to live, and yet they ever transgress the laws of true physical life, obeying which, accidents excepted, long life would be almost absolutely certain.

The most glaring of our mistakes is the neglect to supply our houses with sweet, pure air during the cold months; especially so, because it is so easy of correction. Pure air costs literally nothing; but, as President Eliot, of Harvard University, said but yesterday in an address before the Massachusetts Medical Society, (he was alluding to lack of hygiene among the students,) "Fresh air is something they have never been taught to drink." How few are taught to drink it! In thousands upon thousands of cases in which life goes out before its flame has fairly begun to burn, death is caused because this drink, this *elixir vitæ*, is withheld from helpless lips. And thousands of

lives which have become of value to the world, fade away because this elixir, so freely supplied, is rejected — and rejected with all the ingenuity of which men are capable.

Do not forget that the fell disease which yearly fills so many graves in our country, and all other lung affections, are invariably better when summer comes. See how grateful to the sufferer is the pure air of the heavens. See how quickly he droops when confined to the house. Why? Lack of pure air! He gasps for it. His death is hastened by its absence. Is there no argument in the picture?

We can have pure air in our houses if we will, but the cost actually deters many from introducing it. "Better is it," says a wise writer, "to spend money on a supply of pure air than on carven work and decorations." Is it not better thus to lay out money than upon the physician, who cannot keep his patients well while they are exposed to foul air?

Fortunately, however, the admission of fresh air need not be expensive. This matter does not belong to my province, but I cannot leave the subject without mentioning at least the simpler means of ventilation.

How, then, may we keep a sweet atmosphere in our houses, and thus avoid "starvation of the lungs and robbery of the blood"?

Among writers on ventilation, you will find such diversity of opinion, that to know what course to take

seems out of the question. But suppose we use our common sense.

Common sense would say, first of all, have open fireplaces. There is no better ventilator; but do not stop them up with gay fire-boards in summer. Ornament the fireplace if you choose, but never *close* it. The next aid is a ventilator furnished with an Arnott-valve set at the top of the room, in an independent flue.

As to where the carbonic acid from the lungs accumulates, as to what direction is taken by sulphurous acid and sulphuretted hydrogen, these topics I leave to another writer, merely saying that carbonic acid is heavier than the air, and will be found near the floor, especially after becoming cool. Some writers say it accumulates near the ceiling. Since all gases pass through each other or become diffused, I believe carbonic acid will be found everywhere in the room, but when the air is stagnant, chiefly near the floor. But we do not just now care so much for the philosophy of this question as we do for a means of hustling these foul gases up the chimney. With our hot fireplace at the floor, and its need of air, and with our ventilator near the ceiling, we have the means of setting our brook in motion. Since the needs of the fireplace will attract air from all directions, we must see to it that pure air is supplied, and not foul and used-up air from elsewhere in the house. Especial care

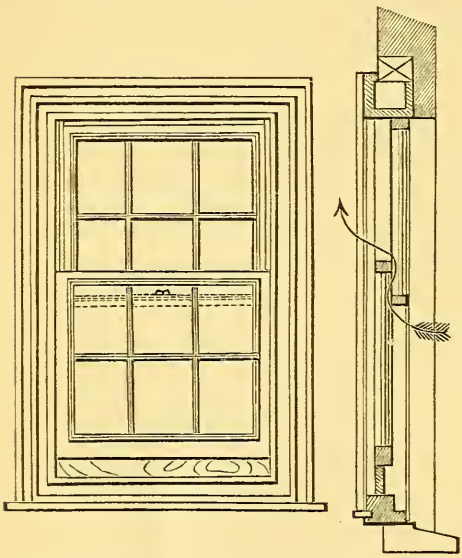
must be taken that no bad air comes from the cellar. A current of fresh air may be admitted through the chimney near the floor and be warmed by the fire before it enters the room. This, however, has to be done when the house is built, or be accomplished at subsequent increase of expense. If this be out of the question, we may use the window as our ventilator.

The proper way of managing a window in winter is not always known. Remembering that upon entering a warm room a current of cold air will act like a stream of water, we may be certain, if the window be opened at the top or bottom, that the air will simply fall in a cascade straight to the floor, and there flow about our feet, thus creating a draught, and exposing us to the danger of taking cold. If the window be opened only at the bottom, the cold air will drive gases to the ceiling, and keep them there, unless there be outlets in the chimney. If opened only at the top, the falling cold air will sometimes drive the gases down to the floor. The extremists who will have an ocean of fresh air at night, often set their windows wide open, and purposely lie in a draught. This, of course, is exceedingly dangerous, and makes the room so cold, that the lungs all night long inhale a freezing air, which is not desirable. A room may be moderately warm, and yet have a pure atmosphere. When a window is opened a little at bottom and top, many think the air by this means is

effectually changed and it is considerably broken up, and there is not much draught. But this arrangement in winter would admit an unbearable amount of cold air.

If the plan first suggested by Dr. Hinkes-Bird, seventeen years ago, be adopted, the window will act as an excellent ventilator. This plan is as follows: Procure several pieces of black walnut, or any other wood, one-third of an inch thick, of various widths, from two to six inches, and long enough to fit the window-frame under the lower sash. The latter is then raised to the desired height, this depending upon the degree of cold; the proper board is fitted into the frame and the sash shut down upon it. The window is thus closed at top and bottom, and the sole place of inlet for the fresh air is between the bars, where the sashes meet at the middle of the window. Flowing in at this point, the air cannot fall as it enters the room, but, as has been proved by experiment, takes an upward direction towards the ceiling, whence it falls, and in so doing becomes mixed with the air of the room. Meanwhile both fireplace and chimney outlet are doing their work, and thus we obtain good air. This method is by no means new. It has recently been newly brought before the public in one of Mr. Eassie's articles in the "Sanitary Record." To make it still more clear, I borrow his wood-cut and insert it here.

The plan is simple and inexpensive, withal so efficient, that there can be no excuse for not adopting it. The width of the board used may depend upon the severity of the weather.



This method is not offered as a substitute for those which are more complicated, but simply as an efficient and satisfactory means of ventilation.

Dr. Keen, the editor of this series, suggests to me an excellent modification of the Hinkes-Bird method of ventilation, just described, which he has used for some years. He tacks or pins a piece of cloth or newspaper across the lower ten or twelve inches of the window-frame and to the window-sill, then raises the lower sash one inch to six inches, according to the weather. By this means the same form of draught is secured, for air enters and takes an upward direction both from between the two sashes and from the opening beneath the lower sash.

A ventilating arrangement now in use in Boston hospitals, is a light frame (similar to those used as window mosquito-bars) covered, in winter, with two thicknesses of stout cotton-flannel, one being tacked on each side of the frame, which is then placed at the upper portion of the window, whose sash is lowered enough to admit it. Patients like this mode of ventilation. I have little personal acquaintance with it; but it is claimed that it keeps the in-door atmosphere pure, and yet causes no draughts.

In case of sickness, the room may be thoroughly aired once or twice daily by throwing all the windows and doors wide open, the patient being meanwhile covered by a blanket, or blankets, thrown over the head-board of the bed. The blanket should remain so long as the air of the room is in motion, and until windows and doors are again closed.

It is ordinarily supposed, if windows be opened fully, that a few moments of such a blast of air as enters will entirely purify the room. According to Cameron, the excess of carbonic acid may thus be driven out; but the organic matter in the apartment requires prolonged exposure to the air before its noxious properties are destroyed. An hour or two of such ventilation would do the work thoroughly; but meanwhile the house becomes chilled. Then the windows are closed, and, if there be no means of ventilation, the air will soon become again impure. The

only way is to keep up a gentle circulation by the mode already described, and have outlets near the ceiling. If, however, the room be heated by a furnace, it will be better to have a valved ventilator at the bottom as well as at the top of the room; but in using furnace heat there is a means of supplying pure, warm air by having a large wooden tunnel leading from the open air directly into the hot-air chamber of the furnace.

Some furnaces have a supply of air, but it is drawn *from the cellar*. Beware of this arrangement; it is dangerously inefficient. Common sense tells us that cellar air is not what we wish to breathe.

But it is a great mistake not to have at least one fireplace in the house; to have one in every room would be still better. The increased trouble and cost of fuel are more than repaid by better health and the delightful cheer of the congenial fire.

Houses heated by steam-radiators are the most unfortunate of all; that is, if the heat be radiated directly into the room. "This," says Leeds, "is one of the most killing systems in existence." If we are not accustomed to such a mode of warming the air, it is only necessary to spend an hour in apartments thus heated, in order to realize how enervating the air is. The proper manner of arranging this system is to have the pipes under the floor, and provide an entrance for fresh air which, flowing across them, en-

ters the room warm; or small registers may be set in the external wall of the house behind the radiators. By this means the air becomes warmed as it flows into the house.

Stoves, if properly made and so arranged that there can be no escape of the products of combustion, will act as fairly good ventilators; for, of course, the draught of the stove will carry up the chimney the air of the room, and this will be renewed by better air from without. They are useful, too, when one wishes to heat a room quickly. But there is a general prejudice against this means of heating; and, according to Cameron, the experiments of General Morin, St. Claire-Deville, Froost, and other chemists and physicists, appear to indicate very conclusively that iron stoves, by permitting the passage through their walls of the products of combustion, exercise an injurious influence upon the public health. "The late Prof. Graham," says Cameron, "proved that carbonic oxide gas was capable of passing through solid iron, provided the metal be heated; and as the front and sides of stoves are liable to become red hot, a large quantity of carbonic oxide generally escapes from the stove into the atmosphere of the room," and this is especially the case if hard coal be the fuel used. Dr. Derby, of Boston, in his pamphlet on "The Influence of Anthracite Stoves upon Health," states that such stoves are prejudicial to health. He recommends the

following precautions in using hard coal in stoves: Fire-brick or soapstone must be in contact with the fire, and stoves should never be allowed to become red hot. There should be as few joints as possible, and these should be horizontal and not vertical. The supply of air to the fire should never be cut off; nor should the free escape of the products of combustion to the chimney be checked by dampers, or by cooling the fire by the admission of air between the stove and the chimney. Coal should be so burned that, under all possible circumstances, a pressure of air from without inward may be exerted upon the fire-pot radiators and smoke-pipes.

Careful attention to this advice would make stoves useful; but the prejudice against them, upon the whole, is well founded, and they are far from being comparable to open fires or the portable grates. Nevertheless, it cannot be denied, when they are used with proper precautions, that they are more healthful than the furnace. It need hardly be said that no stove, especially the so-called "air-tight," should be without an evaporating dish of generous size.

One more cause of impure air should again be mentioned, viz., the lights. Whatever their nature, they require a large quantity of fresh air for themselves alone. Their effect upon the atmosphere has already been mentioned, but I gladly make use of a severe and wise criticism upon the effect of the too common source of the lights of city houses. I ex-

tract it from the London *Lancet*, one of the most reliable medical journals in the English language:

"To have our rooms pleasantly illuminated with gas is to undergo a process of poisoning, the more disastrous because, instead of directly producing the characteristic symptoms of defective blood-oxygenation, the gas-polluted atmosphere insidiously lowers the tone of vitality, and establishes a condition favorable to disease. It would be difficult to overrate the importance of this household peril. Pictures are spoiled by gas, gilt mouldings are tarnished, the colors of decorated walls and ceilings fade, and men and women of delicate organization are enfeebled and injured by the foul air in which gas is discharged and supposed to burn inocuously.

"The extent to which this evil works in the midst of families, during the long evenings, is not adequately appreciated. After the first few unpleasant experiences are over, the physical insensibility becomes inured to the immediate results of breathing an atmosphere charged, more or less heavily, with the products of combustion and unconsumed coal gas. It is not creditable to the ingenuity of practical men that no method has yet been devised by which the advantages of gas as an illuminating agent may be secured without the drawback of slow poisoning, with the host of maladies a depressed vitality is sure to bring in its train."

It may be convenient to use illuminating gas for

hall lights, but in our rooms far better are the delightful German student or the French Carcel lamps. After using them for a few weeks, everybody notices a difference in the air. There is less dulness, headache, and lassitude; the eyes, too, are grateful for the change, for the light of these lamps is much clearer, steadier, and moreover much cooler, than the gas flame. More than this, the plants about the house immediately brighten up and become more vigorous. Indeed, I have remarked that plants which grow in rooms where no artificial light is used, are the most thrifty of all. Another satisfactory feature is that the quarterly gas-bill shrinks most wonderfully.

In my brief allusions to the means of introducing pure air, I would have it understood that I have merely touched upon the subject, having suggested only the simpler aids to a better purification of in-door atmosphere during the cold season. Readers must look for fuller details in the primer already mentioned.

Nature provides an overflowing wealth of clear, sweet, pure air. If we reject her bounty, we shorten the lives for whose well-being we are responsible. A pure air exerts untold influence in lengthening life, and in securing health and mental ability. "A cold mirror is not more quickly clouded by the breath, than is the brain affected by an abnormal condition of the blood," and blood rapidly becomes abnormal if air be impure.

CHAPTER V.

DANGER FROM OVERHEATED AIR.

THE subject of this chapter is logically suggested by the consideration of impure pulmonary food. Overheated air, if pure, is not so prolific of danger as air which is foul; but it is far from safe. The average temperature of a living-room should never be higher than 68° to 70° Fah. Yet many think the room unbearable if the mercury stand below 72° or even 75°.

The warmth of the sleeping-room should not exceed 58°. I do not mean to say, if the temperature were five or six degrees higher, that it would do any special harm, supposing the air to be pure, but, as regards health, the lower degree would be much better. Every needless degree of artificial heat lessens our power to generate heat for ourselves. If the temperature of our rooms be kept at the degree which has been found the proper one for health, the heat-producing powers of the body will remain vigorous, and consequently keep the skin at a comfortable degree of warmth. But in overheated air, the normal

powers of the body become indolent, and therefore produce less heat. The result is loss of bodily power; for the more heat the less vigor.

We should train our sensations, and watch them, so that when the mercury begins to creep up above its proper place, we may notice the change, and at once take means to lessen the heat of the room; otherwise, a person never knows whether the temperature be correct. He begins the day in a room whose thermometer registers 68°. In a few hours it has reached 75°, or, we will say, even 80°, but the occupant has not remarked it, and not only feels no warmer than he did when the mercury stood at 68°, but it may happen that he is conscious of chilly sensations, which were absent at the lower temperature.

Take another example: With an interesting book, a person sits down near the fire, whatever its source may be. Pretty soon his extremities have become thoroughly warm, but after a little while he puts down his hand to see if there be as much heat as at first. By and by he feels creepy, chilly sensations in the portions of the body farthest away from the heat, and, perhaps, puts on an additional garment. Meanwhile, the temperature of the apartment has risen several degrees. If the individual now leave the fire and sit in some other part of the room, he soon feels actually cold. He goes to the thermometer, and finds the mercury at 75°! This sketch is so far from being

imaginative, that we all have had the experience in person scores of times.

Heat is an extremely seductive thing. Entering a room from the open air, we naturally go at once to the fire. Its effect is delightful, and there we stay, or in close proximity. Many individuals invariably take this place in winter. Some persons always place themselves as near the fire as if they were to be served up in an underdone condition to Jack's giant. Such a singularly bad habit finally produces a collapsed skin — parboils it, as it were. And these individuals are always "half-frozen," always shivering, always running for an extra garment, when others are in perfect comfort. In the course of time they are not only always cold, but they cannot become warm. Tone and vigor are gone. Fancy the effect upon such a person of an invitation to face a glorious snow-storm!

Immoderate use of heat during the winter is the cause of much illness. Your daintily housed, overheated woman has no power of resistance. She breaks down by self-indulgence in the use of heat. In our climate we cannot escape sudden changes from warm to cold air; but if our lives are so arranged that our bodies are kept well toned and properly guarded as to clothing, we can meet the transition with comparative freedom from danger of chill.

But the effect upon the general vigor of many hours

daily spent in over-warm rooms is like that of heat upon a figure in wax. It droops, loses its firmness, and, little by little, will show absolute outward change. Moreover, one of the positive results of hot air is that it paralyzes the action of the heart. Suppose you were to put your arm in a sling, and make no use of it for three months. At the end of that time, what would be its condition? It would be weak, shrunken, almost powerless. Only by a system of careful exercise of weeks in duration could its original vigor be restored.

Now, when a person indulges in too much artificial heat, this is what happens to the skin, and through its collapse also happens to the system at large. A person leads a sedentary life in hot rooms. As winter deepens, the cold grows more forbidding, the fire more seductive. Fresh air is shut out, the skin becomes less and less able to resist changes of temperature. When this person does go out of doors, no matter how much clothing he may wear, he suffers, and a cold is almost sure to result.

In winter, when we put our hands first into hot then into cold water, they naturally become chapped. The mucous membrane of the throat and lungs is subjected to a very similar experience, for we are constantly going from the warm house into a biting, cold air. How intense must be the effect upon the over-sensitive throats and lungs which, week after

week, in rooms far too warm, but seldom receive the refreshing, tonic influence of pure, fresh air, and which, too, as a result of the enervating action of the constant hot-air bath of the house, are all ready to become congested. For, when individuals who hug the fire and drive the mercury up among the seventies, do go out of doors in winter, they are between an upper and a nether millstone, viz., on the one hand the cold air which they inhale and to which their lungs are not habituated, on the other, the chilled and chilling blood which rushes in upon the internal system from a skin so inert and lifeless that it at once succumbs to cold.

Fortunately, all the blood of the body does not pass through the skin. If it did, sudden death and dangerous lung and throat affections — which as it is cost more lives than do almost all other diseases together — would be still more frequent in our rigorous winters. But such blood as does pass through this moribund skin — which in a healthful condition would partake of the glow created in the general system by a cold-air bath — returns to the interior chilled, and there, as explained in the second chapter, dams up the blood which should be in the skin. As a consequence, the lungs become overcrowded, and the heart is subjected to sudden and dangerous strain. Lung or heart trouble probably would be the first to seize upon the undertoned individual, or kidneys and bowels would suffer, and in many cases rheumatic and neu-

ralgic affections would result, not to mention the danger to which the brain of aged persons would be exposed. But bear in mind that lack of power to resist cold is a forerunner of evils which develop into those tiresome and often incurable catarrhal affections so common in our climate.

Consider, too, the effect of overheated rooms upon the *mental powers*. No student, no thinker, no worker in the domain of intellect, can possibly be at his best, if his sedentary life be spent in an air so warm as to prevent a healthful circulation of the blood. The latter, instead of being a fresh, joyous, bounding life-stream, becomes dull, stagnant, and indolent. The heart grows less active, the lungs partake of the general apathy, and inspiration, instead of being full and deep, becomes shallow and inefficient. This only adds to the uninspiriting quality of the blood, for it receives far less than its meed of oxygen.

Meanwhile, what of the brain? Need I answer? How long can it remain bright and active, if it live only upon this slow, turgid blood? It becomes dull, heavy, cloudy, stupefied. Its owner wonders why he feels weary, sleepy, incapable of work. He is disgusted with the creations of his thought, irritated by the discovery that he is no longer receptive, perhaps anxious about his condition. He fears he is overworking, and thinks of change. The only change he

needs is a cooler air, more oxygen, and more exercise. All things being equal, hygienic laws being obeyed, no amount of mental labor is attended with danger, unless it be monotonous in character, for as the stomach requires a varied diet, so does the brain. *Verbum sat sapienti.*

The *children* shall have a separate paragraph, if in this way I can but make their cause more impressive. Poor, helpless ones! it is a sad pity that they must bear the hygienic sins of the careless parents in whose control they are so absolutely placed. In the minds of many parents is firmly rooted the peculiar tradition that children can bear anything in safety; that anything is good enough for them. If need arise for any sort of self-denial, the children are put off with the poorer quality of whatever it may be, while the parents take the better, for too often their own comfort is paramount. And so in countless ways the defenceless little ones are made the victims of the indolence, negligence, selfishness, and (by way of making some allowance for them, let me add) the *ignorance* of their elders. The physical, mental, and moral education of children is a responsibility so immense in its extent, and so sacred as a trust, as well as a privilege, that the mothers of our land surely find their sphere of action, if they are true to it, full to overflowing. Let them give their womanly influence, if they will, to public and social questions,

but not at the cost of neglect of their children. Without pursuing this phase of the question, let me say that mothers who keep their children in overheated rooms, *do* neglect them, and dangerously.

The adult judges by *his* sensations. If the temperature of the room be right for him, it must be so for the children. But *they* are not sedentary. They are active, ever on the move, and therefore manufacture heat for themselves. All they need in the temperature of the room is a degree of heat which will not too rapidly deprive them of *their* warmth. But the mercury is allowed to mount, or is forced, up among the seventies or eighties, and the children, still playing with their usual vigor, begin to perspire. A few hours of such a condition not only exhausts them, not only makes them sensitive to the slightest chill or change of air, but fretful and restless. As winter goes on they lose their tone and appetite. They begin to be wakeful at night, to grow pale and weary looking. This is the result of too much heat and too little oxygen. If their condition be no worse than this, the mother may be thankful. But they are forever rushing out of the hot room into a cold hall, perhaps even out of doors. Only lock and key can prevent it. What, then, is to save a perspiring, low-toned child, whose skin has lost reactive power in the overheated air,— what is to save this child from the most dangerous lung and throat affections? Ordinary

colds it will have, whether or no. But pneumonia, croup, bronchitis, perhaps even diphtheria, are the foes to be dreaded. And this enfeebled child is in constant danger. Its unobserving mother has not seen how much less buoyant the child is now than when winter began. The change has been gradual, and if her attention be called to the pale look of the child, she will say it is probably due to the fact that it is not going out so much as formerly, and so forget the matter.

What is the remedy? The remedy is cooler rooms and, if need be, more clothing. In addition to this, children as well as adults should keep their power of resistance at a normal degree, and teach the bodily sources of heat to act with such vigor that a room of the proper temperature will be warm enough for them. This is to be accomplished, not by a sedentary life in the house, but by daily exercise in the open air. This matter, indeed, is so vital, that I shall devote a separate chapter to it.

One other effect of overheated air should be mentioned — the great dryness it creates. In winter the air is usually very dry. Upon being heated, however, it has an immense affinity for moisture, and, as Leeds says, if this moisture be not then supplied in some other way, it will take the natural humidity from the skin and lungs, thus creating the dry, parched, feverish condition so noticeable in rooms heated by stove and

furnace. The majority do not heed, or are not aware of, the great necessity for a supply of moisture in rooms artificially heated. The higher the temperature, the greater should be the quantity of moisture supplied. To demonstrate mathematically: for every increase of 27° of temperature, air doubles its capacity for holding water. Thirteen cubic feet of air weigh one pound, so that a room 15 × 12 × 10 contains 1800 cubic feet, or about 138 pounds of air, which at 10° will hold about half a pound ($\frac{1}{2}$ pint) of water. If its temperature rise to 70°, its holding capacity will have increased to about two and one half pounds, and therefore will require two pounds, or pints, more of water than when the mercury stood at the lower figure. How shall this humidity be obtained, unless it be artificially supplied?

Artificial heat is bad enough, but if it be also dry, the danger to which lungs and throat and heart are directly exposed, is much increased. The head of every house should make it his personal duty to see that the evaporating-pan in the furnace is kept filled with water. Servants cannot be trusted. They invariably forget or neglect this important requisite, unless the matter receive the constant attention of the employer. Every stove, of course, should have its pan of water. There are very neat appliances now made, which may be attached to the furnace-register, for the purpose of evaporating water into the room

with the heat. If the room be heated by an open fire, the air will be more frequently changed, but, nevertheless, there should be means provided wherewith to furnish the air with plenty of moisture.

The plan which I have followed is to keep upon the mantel a large glass fish-globe, minus the fish. Any ornament, as a pretty statuette, may be placed inside at the bottom of the vase; the water and shape of the globe, acting as a double-convex lens, magnify the object, so that the affair may be made beautiful as well as useful.

During the winter days, and while artificial heat holds sway, the water requires frequent renewal; but in summer, the windows being constantly open, I have been struck by the fact that the water remains at the same level for days at a time, thus showing that if the air is not supplied with necessary moisture in the natural manner, it will take it where it can find it. If not in an artificial supply, it will extract it from our bodies, our furniture, and from whatever contains moisture. We all know the physical effect of a dry, hot atmosphere. In a short time one fairly gasps for a breath of normal air. The neglect to provide a supply of water is felt not only in our houses, but creates especially uncomfortable sensations in churches, theatres, school-rooms, and other places where many lungs make short work of using up the healthful qualities of the air.

Before I leave this subject, it may be necessary to say that very young infants, the very old, require a higher temperature than would be healthful for intervening ages. They cannot manufacture heat rapidly, but they lose it quickly, and consequently must have plenty of warmth supplied them. The sick, and notably the convalescent, after leaving the bed, are always extremely sensitive. They must have a temperature of 70° to 72° Fah., otherwise the return of health will be retarded. Exceptions must, however, be made during an attack of fever of any sort. In such case, the room should be kept only moderately warm; the proper degree will be fixed by the attending physician.

CHAPTER VI.

INDIFFERENCE TO SUNSHINE.

ALEXANDER THE GREAT once went to Diogenes, as he was reposing in his tub, and asked him what he could do for him. Diogenes replied: "Stand out of my sunshine." The conqueror of the world offering a choice of gifts to a man who had not even a roof to cover his head, and yet who chose nothing but the sunshine, which was his already! Considered from a hygienic point of view, the story contains a striking moral.

One of the great mistakes of the winter season is indifference to sunshine, when it is possible to live and sleep in sunny rooms. Such indifference is attended with serious danger. In the choice of apartments, anything and everything within reason ought to be sacrificed to the necessity of having the living- and sleeping-rooms where they can every day be purified by the sun. Instead of having guest-chamber and parlor in the sunshine, they should be given the shady side of the house; for, in comparison to the family rooms, they are but little used.

In the health of females, children, and invalids who, during the cold months, spend so much time in-doors, it makes a vast difference as to whether the rooms in which they live are in sunshine or shadow. Look at the faces of miners, of clerks who are immured in dark offices, of women and children who hardly see the sun in winter. How faded, colorless, and unhealthy they are in comparison with the faces of those who *will* have sunshine in-doors and out.

No one would think of keeping plants in a shady room, out of the sunshine. The plants are crowded about the most sunny windows. We know that if kept in a sunless place they cannot thrive. Why do not people consider that human beings, if deprived of sunshine, will droop and fade as quickly as the plants? The old Italian proverb, "Where the sunshine does not enter, the doctor must," has been quoted so often of late that it would be trite but for the truth it contains.

We cannot *see* what the sunshine does to the air of our houses; but if we go into a room to which sunshine is a stranger, we notice something in the atmosphere which is so peculiar that we at once say: "Surely, this room is never purified by the sun." To prove the difference between the effect of an unsunned and a sunny apartment, it is only necessary to move children from a dark to a bright room, where the sunshine plays several hours daily. Within forty-eight

hours they will look brighter, will sleep better, their tempers will sweeten, their appetites improve, they will play with more vigor. Is not the improvement in their health a compensation for whatever trouble the change may have cost? Children should have the brightest rooms in the house for play- and sleeping-rooms. They are kept in-doors so many hours every day in winter, that everything should be done to remunerate them for their loss of the out-of-door sunshine and air. The same may be said of adults who go out but little in cold weather. Many mothers think it unsafe to allow the children to go into the winter air. This is an error which I shall endeavor to show in the chapter on Exercise.

I have watched with the greatest interest a geranium plant which stands near my window. When it came into my possession, I remarked that every leaf faced in one direction. Whenever they are moved away from the light, these leaves at once begin to turn about, and within a day or two turn completely around, never resting until they face the sun again. What a lesson in this instinct! Leaves *will* have the sunshine, if they can find it. Should human beings be less wise than they?

During the winter season we need every possible health-giving influence. Deprived of sunshine, we are less able to meet the stringent stresses of cold weather. Anything which lessens our animal vigor,

lessens also our ability to cope with the great changes in temperature, and the imperfect hygienic conditions to which winter exposes us. What sunshine is able to do for all life, may be seen in the joy of the birds, in the increased activity of animals, and in the greater vivacity and cheer which we feel when the sunshine returns to us after days of absence behind the clouds. How we miss it while it is gone! How its absence, if prolonged, depresses us! Should we not learn the lesson, and insist upon securing every ray of sunshine which we can admit into our houses during the winter season? Life in dark, sunless rooms not only injures the bodily health, but most seriously depresses the mind. Under such conditions, gloomy moods unknown in summer will seize upon the adult, and the children will surely become fretful, irritable, and unhappy.

Above all, sunshine should be given to the sick. The progress of the illness and the effect of remedies will then be a thousand-fold more favorable. Why do constructors of hospitals use every ingenuity to secure the greatest possible amount of sunshine? Because experience has shown that the death-rate is less, the duration of disease shorter, and the patients far happier and more cheerful in the wards which have the sunshine for the greatest number of hours during the day. We hang our bird-cages in the window, out of doors, if possible, because, deprived of the

sun, the birds droop, perhaps die. And yet we forget that to human beings the sun is just as necessary. There is more tonic, life-giving effect in sunshine than in any drug known to man.

Now it may happen that it is impossible to admit sunshine to every room. But it should be known that if the doors between rooms which open into each other be left wide open during the sunny hours of the day, the atmospheric changes which are produced in the sunny room will be communicated in a large degree to that room which has a northern exposure. The housekeeper's fear of the effect of sunshine upon carpets and curtains, in too many instances, costs more than both. It costs *health*, which is above all price.

CHAPTER VII.

SEDENTARY LIFE AND NEGLECT OF EXERCISE.

THE man who owns a valuable horse knows, or should know, that, in order to keep the animal in good condition, he must be exercised every day. Indeed, if the horse were kept in the stable day after day without air or exercise, every neighbor who loved a fine horse would feel annoyed. It would be said of the owner, "He has no business to keep a horse. He owns a beautiful animal, which is going to ruin simply from lack of exercise." A sensible man, if he have no time to drive his horse, will even pay for the privilege of having him driven. Alas! if we but gave ourselves the excellent care which animals receive, how different would be our physical existence. How much healthier, brighter, happier, how much more prolonged!

Sedentary life and neglect of exercise simply mean stagnation of every force and capability of the body. In summer, exercise and movement are not only common elements of the daily life, but they are *the fashion.* The power that fashion wields need not be

set down here. In winter, on the contrary, exercise, in far too many instances, is laid away with the summer garments.

Dean Swift, one day, asked his servant why he had not blacked his shoes. The man (also an eccentric) replied: "'T would be of no use, sir; they would be dirty again before night." A little later, Swift called his servant to accompany him as he went into the town. The man reminded his master that he had had no breakfast. "That does n't matter," said the Dean; "you would be hungry again before night." Just as reasonable are the people who fancy that, in their brief exercise during the summer vacation, they pack away vigor enough to last until summer comes again. Undoubtedly an individual has more endurance in winter, if he have prepared himself for its wear and tear by an abundance of movement and activity during the preceding summer; but to think that it will suffice to keep him at his best, is most foolishly erroneous. And yet there are people who salve their physical consciences by just such mistaken theory.

In order to keep the body in health, the whole machine and all its parts must have exercise; otherwise, there will occur a lessening of good and healthful conditions, and the organs which are allowed to remain in a quiescent state will gradually become less vigorous. Exercise, of course, means systematic use

of the voluntary muscles. By this means the organs of the body become stimulated and strengthened. In order to give the body, and its organs, a normal buoyancy and power, their elements must be constantly renewed, and this can be accomplished only by exercise which increases the speed of the blood, renews the various tissues of the body, and increases the activity of the lungs and heart. The lungs receive especial benefit by active movement. Respiration becomes quickened, large quantities of oxygen are poured into the blood, and the revivified life-stream refreshes every portion of the system. We are all familiar with the delightful glow and stimulus which follow a well-directed amount of exercise. This of itself should tell us how beneficial it is. On the other hand, we know how depressing are the sensations which gradually take possession of us when our lives are sedentary. To expect, under such conditions, that our bodies can serve us with their full power, that they can meet and resist the stress and strain of winter, would be like trusting ourselves to an old and leaky boat, when we might have a sound one. Without muscular movement, the health will invariably suffer, and this, during a season in which safety requires that we should be at our best, simply increases its dangers. For any influence which lessens our reactive power and our power of resistance renders us only the more liable to fall a prey to some disease

which winter brings. As already mentioned, the lungs experience the most powerful effect of muscular exercise. The respiration is quickened, an immensely increased amount of air is inhaled, and a correspondingly larger quantity of carbonic acid exhaled. The investigations of Dr. Edward Smith show that the difference between the quantity of air inspired in the quiescent, lying position and when walking at the rate of six miles per hour, is as one to seven. This fact is so significant that no other argument in favor of exercise should be necessary. But there is another statement which with equal force proves the great benefit of bodily movement. This statement is in the form of statistics in regard to the difference between the amount of oxygen absorbed and the waste matter given out during rest and exercise. It is the result of the observations of several German scientists : —

	Absorption of Oxygen in Grammes.	Elimination in Grammes of		
		Carbonic Acid.	Water.	Urea.
Rest-day	708.9	911.5	828.0	37.2
Work-day	954.5	1284.2	2042.1	37.0
Excess on work-day (with exception of urea)	245.6	372.7	1214.1	—0.2

This table I have copied from Parkes' work on hygiene. Parkes adds, "it seems probable that the great formation of carbonic acid takes place in the muscles; that it is rapidly carried off from them; and if it is not so, it would seem highly probable that their strong action becomes impossible. At any rate, if the pulmonary circulation, and the elimination of carbonic acid, are in any way impeded, the power of continuing the exertion rapidly lessens."

With such authority in behalf of our need of exercise, with the evidence, too, which our own sensations give us, the danger of following a sedentary life, and of neglect of bodily movement, becomes strongly apparent. One of the active causes of lung disease is neglect of exercise.

In my gymnasium days, I met a young man whose muscular development and remarkable achievements upon the parallel bars, with heavy dumb-bells, and at the leaping-horse, were the admiration of the frequenters of the gymnasium. In conversation with him, I learned that he came of a consumptive family, and that twice already he had been brought very low by an affection of the lungs. By advice of his physician, he began systematic gymnastic exercise. His health at once improved, and in a few months he possessed unusual vigor. He then lessened the amount of exercise. Within one month his strength again began to fail. Returning to steady, daily use of the gymnasium, he once more reached the con-

dition of health which he had lost. Again abandoning exercise, again his health failed him, until finally he became convinced that his life depended upon a daily invigoration of his body by solid exercise, and dared not omit it.

In using the help of bodily movement, excessive exertion, of course, must be avoided. What we need is merely such exercise as will stimulate the whole system, and increase the force and flow of the blood. Every one who has had any experience in this direction knows how exercise invigorates the body, hardens the muscles, increases the appetite and breathing power, freshens the brain and mental capacity, cheers the spirits, and drives away blue-devils and moods. It is a sad mistake to think there is no *time* for exercise; the truth being, that, if we do systematically refresh and renew the body and its ability by healthful muscular movement, we can accomplish at least twenty-five per cent. more in whatever our work may be, and particularly if this work be mental.

What the form and kind of exercise should be, I will not attempt to delineate, but will refer my readers to the excellent book on this subject written by Mr. William Blakie,* and recently published. It may, however, be said that lung gymnastics are not sufficiently practised. They act upon the whole system in a most

* How to Grow Strong and How to Keep so.

salutary manner, and are very convenient during the season in which many are kept in-doors. Let the lungs be slowly filled by inhaling the air through the nose, the mouth being closed, or through the closed teeth. When they are full, strike the chest several moderately hard blows with the fists. At the next inspiration, strike out with the fists — upward, downward, horizontally, etc., as ingenuity may suggest. This form of exercise exerts an influence which gives the whole body a fine glow, expanding the chest, and creating a necessity for deep inspirations. I merely allude to this matter, because it is apt to be neglected even in works upon gymnastics.

A most unfortunate result of sedentary life and neglect of exercise during the winter is that it deprives one of the proper amount of fresh air, which at this season is the more necessary, in view of the fact that, ventilate as we may, the air of the house is far from being so fresh and pure as it is in the seasons when the windows are almost constantly open. We live in an artificially heated atmosphere; we use gas many hours every day, and spend too much time in the house.

The loss experienced is especially felt by women and children, who sometimes for days do not go out of doors. This is a serious error, and ought not to be countenanced. Mothers, however, through fear of the effect of the cold air upon the children, keep them in the house. Even though it be cold weather, this is unwise care, and really subjects

the children to greater danger than if they were allowed to go out freely with warm clothing. By this means appetite will increase, and, of course, their strength and vigor. Life in the house will not only make them tender and sensitive, but will not by any means save them from colds. On the contrary, it will render them more liable to contract lung and throat affections; for, kept in-doors, they lose power of resistance to the changes which they will feel nearly as much in-doors as out, and suffer more from them. Confinement, too, makes them irritable and restless, particularly at night; while if their little lungs are swept out every fair day by pure, fresh air, their sleep and tempers will both be sweeter. But when in the air they must have plenty of warm clothing. Let the mothers who wish to make strong men and women of their children, send them out of doors morning and afternoon, when not absolutely stormy, but not earlier than ten o'clock, A. M.; nor should they be out later than four o'clock, P. M. The heartiest, most robust children are those whose mothers insist upon giving them plenty of fresh air. Of course, on very cold days the clothing must be warmer, and the stay in the winter air correspondingly shorter. I would have it understood that this advice applies to *all children* over four months of age. The tenderer the age, the greater should be the care and the less the length of time spent in the cold air. Children may be sent out for a few minutes, then brought in for warmth,

and again sent out. There are but few days in any winter when children may not go or be taken out of doors.

In this place, allusion may properly be made to the relation of warmth and exercise to food. Never exercise at any season upon an empty stomach, and above all in winter. Many people take a drive at this season, heedless of the fact that they are fasting. Much enjoyment is lost by this practice and much discomfort gained; while the danger of becoming easily and quickly chilled grows in relation to the length of time which has elapsed since food has been taken. The mystery as to why a person is cold during one walk or drive and warm on a similar occasion, may be explained by the fact that, in the one case, the stomach was empty; in the other, it had a supply of nourishment. In very frequent instances, too little clothing is taken, especially for a winter's drive. The rule in this regard should be *to put on more clothing than seems to be needed.* It will invariably be found that the extra amount of dress merely adds to one's comfort. But food before a drive or a walk in winter is as necessary as plenty of clothing. Upon this point we have the valuable testimony of Sir John Franklin, who, while on his expedition to the North Pole, wrote: "During the whole of our march, we found that no amount of clothing could keep us warm while we fasted; but when we went to bed with full stomachs, we passed the night in warmth and comfort."

At any hour of the day we are less able to resist cold, if we are fasting. This applies equally well to the night hours. With some exceptions, I consider it unwise to go to bed hungry. It is more difficult to become warm, and less easy to fall asleep. We wake in the middle of the night, and find the stomach faint. The well-known disagreeable gnawing sensation takes full possession. We become more and more restless, and grow chilly. If we then get up and eat a cracker or two, or a slice of bread and butter with half a glass of milk, warmth will return, and sleep will soon follow. This has especial bearing on the wakefulness of children, who, once fairly awake, toss and turn, and cannot sleep. Try the experiment of giving a restless child a simple cracker. It will fall asleep soon after eating. In the case of invalids, a lunch should always be given in the night, if they be wakeful. The food not only quiets them, but adds to their warmth. This theory may startle those who believe in refraining from food from dinner, if late, or supper, until breakfast. Nevertheless, the stomach being in a normal condition, we should always eat at night when really hungry, the sensation of hunger being Nature's appeal for nourishment.

The common idea that the habit of eating at bedtime is injurious, probably arose from a lack of sense in the choice of food. Mince-pie, pickles, rich pastry, fried oysters, salads, and the like, at the

sleeping hour, are like so much rusty iron to many stomachs; but lean roast beef, or mutton, bread and butter, raw oysters, a cup of beef-tea, bread and milk, if taken in moderate quantities, will not only do no harm, but in winter, particularly after a drive, the theatre, or a concert, will give one comfortable warmth and healthful repose. It is the lessened power of retaining our heat and resisting cold while fasting, and the important and beneficial aid of food in creating warmth, which has suggested mention of the matter here. Individuals who are liable to take cold easily, above all, those who are suffering from an affection of the lungs, or any other organ, should never be permitted to go to bed hungry in the winter season. Lack of nourishment creates chilliness in the sensitive, and, for the same reason, retards the recovery of those who are ill.

It is a mistake, too, to suppose that alcoholic beverages will act as a defence when one has to face a cold air. On the contrary, they reduce the temperature of the body and detract from bodily power. As already mentioned, alcohol is chiefly useful as a temporary stimulus. Its warming effect upon the throat and stomach is merely local, and does not extend to the blood and nervous system. Far better is it to take hot soup, beef-tea, hot milk, or even coffee. What we need at such a time is nourishment as well as warmth.

CHAPTER VIII.

THE DANGERS OF SCHOOL-LIFE IN WINTER.

SIMPLY because school-life and its conditions are peculiarly detached from home-life, I have chosen to give them a separate chapter. I have little or nothing to say concerning the dangers of too great mental exertion, for they are not confined to the winter season. But, naturally, mental exertion is more difficult and more exhaustive when bodily and surrounding conditions are unhygienic, when the school-room is too hot, too cold, its air too dry, and vilely impure from the breath of hundreds of children, and the gas of leaky furnaces and stoves, than when the windows are open, and the air comparatively pure.

When our normal schools and colleges insist that their graduates shall be as familiar with hygienic laws as with grammar or geography, we may succeed in lessening the dangers to which our school-children are exposed. It is well that our local boards of health are becoming more and more interested in school-hygiene, and that medical supervisors of schools

are being appointed here and there, as they should be in every city and town; but unless there be a ready, an intelligent, an *educated* cöoperation on the part of the teachers, can we wonder that the improvement in school-hygiene is so slow and imperfect? The teachers must be so educated that they will not only respond to the behests of their board of health, but be themselves a board of health, be watchful of the quality of the air in their schools, of the temperature, drainage, water, etc. They should consult, not their own comfort, but that of their pupils. And this solicitude should include not only hygienic conditions, but the effect upon their pupils of the amount of study given them. There are too many teachers who manage their pupils as if, like candles of a certain size, they were all run in one mould, so that while some children are able to bear the *régime* of their school, others sink under it. Every child should be considered an individual, and not merely an integral part of a whole. Otherwise, there will always be some children who are working under too high pressure. Observing their inability to vie with their more robust classmates, the thoughtless teacher still further impedes their progress by her impatient criticisms. Any unsound system of teaching is the more trying to the pupils during the conditions which exist in the winter months, for school-hygiene has not yet made such advance that nothing remains to be done. There is

no room for doubt that a very large proportion of the sickness of these children is due to unhygienic conditions in the school-room.

In considering the hygienic needs of schools, the first thing which suggests itself is the too commonly impure air. Here are hundreds of children in the same room. How very rapidly such a number of quickly moving lungs must use up the oxygen! The odor of the unaired school-room is so characteristic, that I hardly need dwell upon it. The teacher, perhaps, is not vigorous, and feels uncomfortable if a window be opened. Personal comfort alone is consulted. The children grow restless, inattentive, sleepy. The teacher becomes irritable and impatient, and very likely depressed in bodily tone. How can the school be successful? What the effect of this terribly impure air must be, has already been indicated in another chapter. It not only actually injures every child in the room, but renders them all liable to take cold on their way home, simply because depressed vigor lessens power of resistance. The children have a short breathing space at noon, and then return to the vile air of the school-room, which the unwise teacher, again consulting personal comfort, has not aired during the intermission. Is it strange that a large proportion of school-children suffer from one ailment or another during the winter?

What should be the remedy? Above all, a constant

inflow of pure, sweet air. The inflowing current must not be so vigorous or rapid as to create a draught, but, entering at different points, should be so controlled that, while it does not chill the room, it can keep the air in *constant*, though gentle, motion. By proper arrangement, it may be warmed as it enters. How, is a question which lack of space will not allow to be discussed here. Sanitary scientists may decide the matter, and they *can*, if school-boards will but insist upon it.

Another danger to which school-children are exposed in winter is the effects of a dry, hot air. Such air is an absolute poison, which acts principally in reducing the vigor of the heart, paralyzing the power which it needs in order to pump the blood from the lungs and drive it through the "gates and alleys of the body." It need not be repeated that such an influence is deadly. All the smells of the room, many of which are contributed by children who are neglected at home, are made worse by this hot, dry air. But the children are not at fault. It is the teacher's duty to see that the temperature of the room never rises above 68°. If it should, discomfort, if not worse effects, will at once begin. Moreover, a large evaporating-dish constantly filled with pure water should be kept at each end of the room. If gas in large quantity escape from stove or furnace, and the day be so cold as to make it unsafe to open

windows, the school *should at once be dismissed.* Ordinary attention to these matters, if systematic and constant, will do much towards lessening the "murder of the innocents," who so frequently are the victims of their thoughtless elders.

On inclement days, children are too apt to enter the school-room in damp garments or with wet feet. This should never escape the teacher's notice. The children should be questioned, and such as are wet be allowed to dry themselves, or be sent home. The order and regularity of the school are but secondary matters in comparison with the health of the children, whose lives are of untold value in view of their possible future usefulness to the country. To permit children to sit with wet feet, or in damp clothing, is simply a crime. It is the duty of every parent to see that the teacher does not neglect these matters.

Neither should the school-room be too cold (the thermometer should not register less than 65°), for children are less able to resist the effects of excessive cold or heat than adults; they are likewise more seriously affected by impure air.

If a school-room be overcrowded in the winter season, it is difficult, if not impossible, to keep it in a healthful condition. Each child should have the normal amount of breathing-space.

Virchow, the great German pathologist, "agrees with those orthopœdists," says Cameron, "who main-

tain that the school is largely to blame for distortion of the spine." Virchow quotes eminent authorities, and among them Guillaume, who found among 731 scholars no less than 218 with distortion; but it is not probable that our American desks and chairs, whose superior adaptability is well known, so often create deformity. But the matter is of such vital importance that I cannot forbear allusion to it. The principal necessity is that the desks and chairs should be adapted not only to each other, but to the various sizes of the children.

During the dark days of winter, unless the school-room be exceptionally well lighted, a certain proportion of the children, in studying, are obliged to strain their eyes. This matter is of such serious nature, that Liebreich, a distinguished oculist of London, states that short-sightedness, with rare exceptions, is developed during school-hours.

A serious danger of school-life, more profound in winter than at any other season, because of the confined air of school-rooms, is the liability of children to contract contagious diseases. For much of this danger parents are to be held accountable. It seems incredible, yet there are many mothers who, while knowing that the contagion is liable to affect others, will send well children to school when one child is sick with measles, scarlet-fever, or diphtheria. Boards of Health are powerless in their attempts to

crush out contagious disease, so long as parents, in order to save themselves the trouble of keeping well children at home, will obstinately send them to school from a house whose air is infected by contagion. In some cases, of course, this is done through ignorance, but in far too many it is the result of selfishness. The instances in which many pupils of one school have been infected by the children of a single family are so numerous as not to require detail.

The necessity for absolute household quarantine, in case of communicable diseases, is becoming more and more clearly seen. A wise step in this direction is the well-established custom of the Boston Board of Health, which, so soon as informed that a person is ill of scarlet-fever, at once excludes from school every child of the family in which the illness has occurred. This enforced absence continues four weeks from the beginning of the attack; and when the pupil is re-admitted to the school-room, it must be on the certificate of a physician showing that the requisite time has elapsed.

But, after all, this does not enforce strict quarantine; for it must be confessed that there are so-called physicians who, through fear of losing a family, will enter into collusion with the parents, — fail to report the case to the Board of Health, — and thus permit the well children to attend school. The chairman of the Boston Board, if permitted by law, would sta-

tion at every house in which scarlet-fever existed, a policeman whose duty it should be to see that no one but the attending physician entered or left it until quarantine was removed. Supplies of food would be left at the door. In Chicago, the authorities have gone further than this. On every house in which a case of scarlet-fever is known to be, is posted a placard, bearing in red letters the words "*Scarlet-fever here.*" An excellent plan; but one which, I hear, does not meet with the proper coöperation. Physicians cover up the disease by giving it some false name, and thus defeat the wise endeavors of the authorities. The blind, obstinate carelessness of the people in regard to scarlet-fever is amazing. It is a disease of terrible danger to young children. What can be done, unless parents take the wise and humane course, by protecting those who otherwise are liable to come in contact with the disease, and so convey it to others?

It is not enough to keep scarlet-fever patients, and their brothers and sisters, away from school merely until the fever has disappeared, but it is vitally necessary to continue the quarantine until the skin of the convalescent child is entirely free from the scales which fall so abundantly after the fever, and, moreover, until the house has been thoroughly purified. Parents cannot possibly be over-cautious in this matter.

The danger from the contagion of small-pox is

really less than from that of scarlet-fever, because in this country children are almost invariably vaccinated while infants. Indeed, many school-boards do not permit them to enter the public schools unless they have been vaccinated, and this rule should be universal. But this is not enough. Vaccination should be repeated every seven to ten years. In that lapse of time the protection derived from the former operation in most cases is used up, and requires renewal. The matter with which a child is vaccinated may be human virus, but it is better to make use of virus taken directly from a healthy cow. Its temporary effects are sometimes more severe than those of virus from another child, but they are more certain, more healthful, and confer more lasting protection.

School-children too often lose their lives, or contract lasting lung affections, by being sent to school after having taken cold or shown signs of disturbed health, and before the attack has fairly developed itself. While at school they naturally are unfortunately situated, for, however chilly or feverish they may feel, they cannot in any way mitigate their condition — the school-room being neither a nursery nor a hospital. Meanwhile, the child may be growing worse and becoming more feverish ; but since it has been sent to school, it does as the other children do, wears no more clothing than is usual, and consequently suffers an increase of conditions which, if the child had

been kept at home and carefully nursed, might, perhaps, have been broken up. But having been sent through the cold air to the trying atmosphere and surroundings of the school-room, it comes home worse; the cold is now, possibly, a serious inflammation, which will confine the child to the bed for weeks, and it may be prove fatal. Of all forms of thoughtlessness in connection with children, to send an ailing child to school, and in winter, of all seasons, is the worst. If a child be ill, never so slightly, keep it at home, watch the progress of the illness, and meet every change in readiness, if need appear, to call the doctor.

In some schools, it is the custom during the cold months to have one long session, generally from nine to one or two o'clock, with a recess of thirty minutes. In this case it is an absolute necessity to provide the children with a substantial lunch to be eaten during the recess. Children digest rapidly. The lapse of time between breakfast and their dinner, after the long session, is far too great to be passed without food. There would not only be positive danger in the walk home through the cold air, with empty stomachs and the consequent lessened power of resistance, but, when the children finally reached the table, it would probably be found that the long fast, and the cold walk after the unsupported fatigue of the school-hours, had deprived them of proper appetite. Children cannot bear unnatural strain. Their lives should

be perfectly systematic and regular, and during the day they should never be allowed to go without food more than five hours.

These remarks concerning the dangers of school-life have been written mainly with reference to children under fourteen years of age. Many of them, however, apply to pupils of an older growth; but they are wiser, and not so helpless as their younger fellows, and therefore, without need of suggestion, would naturally attend to the minor considerations which I have named.

Finally, school-children, as well as adults, are in constant danger, during very cold weather, of being frost-bitten. On days of extreme cold, or blustering storm, the younger children should not be permitted to attend school. Exposure subjects them to great peril, for they have not the vigor to meet either the demands of severe cold or the freezing effect of a swift, cold wind. Hands, feet, ears, and noses, even the cheeks, quickly freeze under such conditions. It may then be set down as a fact of special importance, that to encounter extreme cold is always dangerous, especially in the case of children and adults of delicate health.

When a person comes in with a frost-bitten hand, ear, toe, or nose, what is to be done? The first thing to be done (to put it in Hibernian fashion) *is not to go near the fire.*

In Russia — in whose winter air a nose or an ear will freeze before one can say John Robinson, Esq., — to pounce upon a passer-by, and without a word vigorously scrub his cheek, nose, or ear with a handful of snow, is considered an act of most gentle courtesy. If the victim be a perfect stranger, so much the more deeply does he feel the kindness of this little attention, for he knows that said ear, nose, or cheek was freezing, and that waiting for introductions and permission is dangerous business.

In gentler fashion, this example should be followed when we have to do with numb or frozen fingers, toes, or what not. Plunge the part either into snow or the very coldest water obtainable. If the part cannot be immersed in water, and no snow is at hand, wet cloths may be used and gentle friction employed. All this should be done in a cold room. To apply hot water, or to use heat in any form, would be highly dangerous. It causes intense pain, and imperils the part involved. So soon as the frost-bitten member feels the warmth of the house, suffering begins. The real object should be to prevent too rapid reaction. The application of cold is the only relief. In very severe cases the restorative treatment requires great care, and ought to be supervised by the physician. Let the one rule be avoidance of heat, application of cold, and use of gentle friction.

I began one of my chapters by giving details of

the freezing process. One of the stages is the drowsy condition. Beware of this when exposed to great cold, and never, on any account, allow a child to go to sleep out of doors in winter.

The children should be strictly warned not to sit down to rest out of doors when heated by their winter-play at school, on their way to and fro, or at any other time. The danger of this practice is apparent, and the warning may be extended to adults who are tempted to be equally careless while skating, snow-balling, and the like.

CHAPTER IX.

WINTER AMUSEMENTS.

SO much has already been said touching the topics to be discussed in this chapter, that but little more is needed than to call especial attention to such dangers as may be connected with their use or abuse.

Amusements at theatre, ball, concert, and parties involve exposure to impure, overheated, dusty, and gas-laden atmospheres, and the consequent danger and subsequent effects of very cold air, to which sufficient allusion has been made in other chapters. The remedy lies not so much in the hands of amusement-seekers, as in the control of owners and managers of public buildings, who, if they would but provide excellent ventilation, would surely find remuneration in the increased demand for their rooms by the public; for, in spite of the general neglect of ventilation, people prefer well-aired halls to those whose atmosphere is impure and depressing. Naturally, the same rule applies to churches.

After hours spent in dancing, ordinary good sense will forbid one to go into the winter air while the

body is in a heated condition. Especially so if in ball-costume. For this reason, it is wise to avoid active movement during the half hour which precedes the departure for home, and meanwhile some wrap should be thrown over the shoulders. Even with this precaution, unless great care be exercised in wrapping the body and the feet, the drive or walk in the night air is liable to cause any one of the diseases peculiar to severe weather. The same danger follows a long stay in the foul and heated atmosphere of theatre, concert-room, or church.

Much harm, I believe, is brought about by excessive dancing, notably by women. The pleasure and excitement often urge them beyond their real strength. In spite of absolute fatigue and throbbing hearts, they continue the dance. The depression and lassitude of days following should serve as a warning. The heart, especially when sensitive, cannot safely bear this unwise strain, and delicate lungs are not only irritated by the dust of the room, but are in danger of becoming congested by prolonged and rapid respiration.

During the joyous days of winter — at parties, dinners, late suppers, at the happy Thanksgiving time, and while the merry season of Christmas and the New Year is with us—we are often most seductively tempted to eat more than we need. Rich is the food and strong

the temptation. But the true enjoyment of any good gift of this life consists in *moderation.*

Much of our comfort, too, in cold weather depends upon the *kind* of food we eat. It should be chiefly of a nutritious character, and consist largely of meats, oysters, eggs, and milk. It were, therefore, most unwise to upset the stomach for days by mere kickshaws.

In the foregoing chapter, I have referred at length to the usefulness of simple food in securing repose after an evening entertainment or a drive. Winter amusements, however, often exert a marked influence upon the quality or the quantity of our sleep,

> —"the innocent sleep;
> Sleep that knits up the ravell'd sleave of care,
> The death of each day's life, sore labor's bath,
> Balm of hurt minds, great Nature's second course,
> Chief nourisher in life's feast,—"

To parody the quaint old proverb: as cold waters to a thirsty soul, so is refreshing sleep to weary nerves. But sleep disturbed by the unwholesome effect of overlate hours too frequently repeated, by the bad air of places of pleasure, and by indigestible food, is fitful, feverish, restless, and unrefreshing. Perhaps, indeed, it will not come at all. The following day bears frank witness to the consequent effects. One finds himself, like Ephraim, "a cake not turned." The young are especially unfortunate victims. Studies

are neglected or but half performed. No duty can be fitly executed, and the stupor, the headache, the heavy brain and unwilling mind, not to mention a most unhappy stomach, are significant warnings against over-indulgence in amusements and their accompaniments.

Recreation is as necessary as healthful and constant duty. When the over-thrifty farmer said to his tired boy, "Come, William, we'll quit work and go to sawing wood," he wronged himself and disgusted the boy. But the abuse of enjoyment is doubly wrong, for abuse not only begets insipidity, but demands a rate of interest beyond the rapacity of a Shylock.

Where snow is abundant, sleigh-riding is, *par excellence*, the most fascinating of winter recreations. It may serve as an exhilarating tonic. But if the preparations for the drive be so negligent as to make one feel as if he had followed Franklin's prescription for a sleigh-ride, viz., sitting in the back yard, with the feet in a tub of ice-water, shaking a string of bells,—the drive may work positive harm. Its benefits depend upon warm clothing, and plenty of it; more, indeed, than one would suppose necessary. Always take more wraps than seem to be needed. Did any one ever hear a person complain of being over-clad on such an occasion?

Before leaving the house, the feet should be in a

glowing condition. One could hardly expect them to become warm during the drive, and aching feet destroy all comfort.

Another almost indispensable condition is that the stomach be comfortably filled with warm food. Otherwise, the drive may be merely a prolonged misery, for it has already been shown (page 132) how difficult it is to resist cold while the stomach is empty. Avoid stimulants, and depend upon hot milk, beef-tea, or coffee. If actual chilliness come on during the drive, the only safe thing to do is to stop — at a private house, if no other serve — and become thoroughly warmed.

Never, on any account, allow children to fall asleep during the drive. This is a danger against which we cannot guard too carefully. It is as unsafe as to sleep in the fumes of charcoal, and, unless bodily warmth be kept up to the ordinary degree, produces the same deadly effects.

If the cold be too audacious, and fingers, nose, ears, or cheeks be too rudely caressed, the rules already set down must be carefully followed as soon as the discovery is made.

A glorious sport is a battle with snowballs. The only caution requiring mention is that against sitting down, or remaining inactive out of doors, while heated and fatigued. The reasons for the caution are obvious.

During their play in the snow, in their artistic and architectural attempts at moulding and fort-building, children should be watched, and not be allowed to become too wet and cold.

Spite of the benefits, pleasure, and exhilaration of *skating*, there are some accompanying dangers. The one which, perhaps, exceeds all others is the danger of skating too long. This refers mainly, if not entirely, to women and girls. Boys and men would experience mere lameness; but in the other sex, overexertion on skates is liable to cause troubles of a very serious and obstinate nature. Their own judgment, it is hoped, will teach them moderation.

Sitting down to rest when heated exposes all skaters to chill, which may result in pneumonia, pleurisy, throat affections — even consumption. Remember the weak organ, too, if there be one. It cannot lightly bear this trial of the system; and if a skater have ever been through a rheumatic or neuralgic attack, no temptation of fatigue will lead such an one to take the risks of resting in the open air after exertion.

It may happen that the ice is treacherous. If skaters break through and become wet, the stronger among their companions must at once loan their overcoats and wraps to protect the unfortunates while on their way to the nearest house, where hot blankets and bottles of hot water, hot brandy-and-water, and

severe and prolonged rubbings, must be unceasingly administered until dangers have passed.

But suppose those who have thus been submerged in winter water be taken out unconscious. The remedies suggested must then be used with increased vigor. The head should at first be allowed to hang lower than the body for a short time, in order that water, if it have been taken into the lungs, may run out. Respiration may be restored by galvanic-electricity applied by the physician, who should at once be called. Until and after his arrival, carry the arms of the patient as high as possible above the head; then bring them down to the sides of the body, and immediately after press gently upon the chest at the end of the breast-bone. Do this unremittingly every three seconds, or about twenty times each minute, for hours, meanwhile seeing that the mouth is free from accumulations and the tongue kept forward. Do not despair of success, though hours may pass without sign of revival. Very gentle breathing through a tube into the mouth or nostrils may be employed. Now and then pass an open bottle of ammonia water under the nose. Heat in every form, blankets, bottles, bags of hot oats, and mustard-plasters should be applied all over the body —moderately at first, but in increasing degree. Care should be taken not to burn the flesh. The rubbing should be directed *towards* the heart, that is, *up*, and not *down*, the limbs and trunk. So soon as the pa-

tient can swallow, give stimulants, brandy, whiskey, or strong, hot coffee. Other remedies, such as digitalis, carbonate of ammonia, valerian, etc., will be suggested by the physician.

While skating, it is far from agreeable to see other stars than those of heaven, but this is "a custom more honored in the breach than in the observance." If the fall on the back of the head be so severe as to cause fainting, carry the individual into a house, place the body so that the head may be the lowest part, and administer the usual remedies. In such grave cases it were better to send for a physician without delay. A fall upon the back is fraught with great peril to delicate women.

CHAPTER X.

CLOSING CONSIDERATIONS.

PERHAPS nothing will so much hasten the time," says Spencer, "when body and mind will both be adequately cared for, as a diffusion of the belief that the preservation of health is a *duty*. Few seem conscious that there is such a thing as physical morality. Men's habitual words and acts imply the idea that they are at liberty to treat their bodies as they please. Disorders entailed by disobedience to Nature's dictates they regard simply as grievances, not as the effects of a conduct more or less flagitious. Though the evil consequences inflicted on their dependents and on future generations are often as great as those caused by crime, yet they do not think themselves in any degree criminal. It is true that, in the case of drunkenness, the viciousness of purely bodily transgression is recognized; but none appear to infer that if this bodily transgression is vicious, so, too, is every bodily transgression. The fact is, *all breaches of the laws of health are physical sins.*" And it may be added, that the responsibility which lies upon

us all, especially parents, is a heavy one. When this is truly realized, it must be that health will receive the attention it deserves.

In writing upon subjects of this nature, the mind of a conscientious writer — as he proceeds, as he realizes with increasing force how great our physical sins are — grows more and more anxious lest he may have omitted some fact, some argument, some means of persuasion; lest, after all, he may have failed to convince his readers of the measureless necessity of giving more heed to the righteous demands of their physical being. Indeed, it is next to pleading with a man for his soul. But I have told the plain truth. What can avail, if that do not?

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